LG TRAINING MANUAL

Over-the-Range Microwave LMVM2277ST

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LMVM2277ST (Over-The-Range Microwave Oven)

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IMPORTANT SAFETY NOTICE

The information in this training manual is intended for use by persons possessing an adequate background in electrical equipment, electronic devices, and mechanical systems. In any attempt to repair a major appliance, personal injury and property damage can result. The manufacturer or seller maintains no liability for the interpretation of this information, nor can it assume any liability in conjunction with its use. When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Electronics. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury. If wires, screws, clips, straps, nuts, or washers used to complete a ground path are removed for service, they must be returned to their original positions and properly fastened.

CAUTION

To avoid personal injury, disconnect the power before servicing this product. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks. Also be aware that many household appliances present a weight hazard. At least two people should be involved in the installation or servicing of such devices. Failure to consider the weight of an appliance could result in physical injury.

ESD NOTICE

Some of the electronics in appliances are electrostatic discharge (ESD) sensitive. ESD can weaken or damage the electronics in these appliances in a manner that renders them inoperative or reduces the time until their next failure. Connect an ESD wrist strap to a ground connection point or unpainted metal in the appliance. Alternatively, you can touch your finger repeatedly to a ground connection point or unpainted metal in the appliance. Before removing a replacement part from its package, touch the anti-static bag to a ground connection point or unpainted metal in the appliance. Handle the electronic control assembly by its edges only. When repackaging a failed electronic control assembly in an anti-static bag, observe these same precautions.

REGULATORY INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and the receiver; Connect the equipment to an outlet on a different circuit than that to which the receiver is connected; or consult the dealer or an experienced radio/TV technician for help.

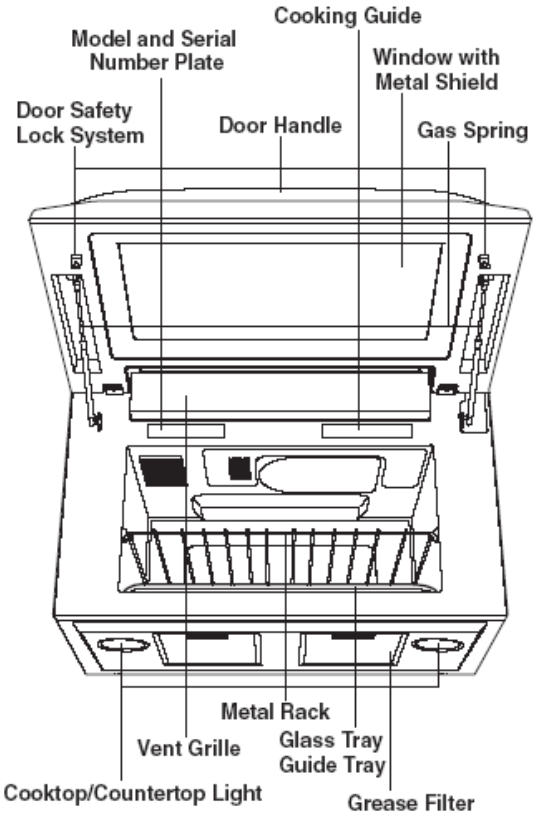
DISCLAIMER

The information in this training manual was accurate at the time of publication. Every effort has been made to ensure accuracy. Updates, changes, etc. are available via GCSC and LGCSacademy. The information in this manual is intended for persons with adequate backgrounds in electronics, mechanical, and electronic servicing. The manufacturer and seller are not to be held responsible for any liability incurred from its use.

COMPLIANCE

The responsible party for this device’s compliance is LG Electronics Alabama, Inc.; 201 James Record Road, Huntsville, AL, 35813.

INTRODUCTION



The LMVM2277ST is part of the new LG complete kitchen suite. It can be purchased separately but is designed to be sold with the matching refrigerator, range, and dishwasher.

This diagram illustrates the major parts of the oven as seen by the customer. The door opens upward rather than swinging out from the left hinge.

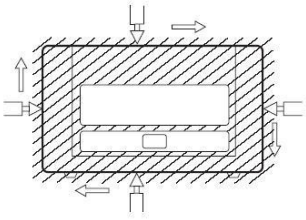
The grease filters, charcoal filter, cooktop lights, and cooking cavity light can all be serviced by the customer. No other parts are user-serviceable.

The turntable, rotating ring, rectangular cooking tray, and turntable drive cam are dishwasher safe and may be removed for cleaning.

Do not use abrasive cleansers.

Move probe along shaded area.

Probe scanning speed
Less than 2.5 cm/sec. (1 in/sec)



Always run a microwave leak test. If the oven is operational, test it before and after the repair.

The Federal standard for leakage is less than 5 mW/cm^2, but LG's standard is less than 1 mW/cm^2.

See the service manual for complete information regarding testing for microwave leakage.

SPECIFICATIONS

Rated Power Consumption	1,700 W max (MWO + lights + fan)
Microwave Output	1,100 W (IEC 60705)
Frequency	2,450 MHz ± 50 MHz
Power Supply	120 V_{AC}, 60Ø
Rated Current	14.5 Amps (MWO + lights + fan)
Magnetron Cooling	Forced Air Cooling
Rectification	Voltage Double Half-Wave
Door Ceiling	Choke System
Safety Devices	Magnetron Thermostat Open @ 145° C ± 5° C (293° F ± 9° F) Close @ 60° C ± 5° C (140° F ± 9° F) Oven Thermostat Open @ 110° C ± 5° C (230° ± 9° F) Close @ 0° C ± 5° C (32° F ± 9° F) Ambient Oven Thermistor Open @ 82° C ± 5° C (180° F ± 9° F) Close @ 54° C ± 5° C (130° F ± 9° F) Fuse (20 Amps) Primary Interlock Switch Secondary Interlock Switch Interlock Monitor Switch
Magnetron	2M282H (Toshiba)
Cooktop Lamps	12 V, 10 W (Halogen)
Cavity Lamp	12 V, 20 W (Halogen)
Timer	Digital to 99:99 in each cooking stage
Tray	Tempered Safety Glass
Cavity Capacity	2.2 cu. ft.
Accessories	Owner's manual, cooking guide, exhaust adapter, exhaust damper, mounting kit, filter, rotating ring assembly, glass tray, metal rack, defrost plate

SWITCH CHART

Switch Mode	Primary	Secondary	Monitor
Conditions	COM N O	COM N O	COM N C
Door Open	OPEN	OPEN	CLOSE
Door Closed	CLOSE	CLOSE	OPEN

WARRANTY

LG MICROWAVE OVEN LIMITED WARRANTY — USA
Model: LMVM2277ST

LG Electronics Inc. will repair or replace your product, at LG's option, if it proves to be defective in material or workmanship under normal use, during the warranty period set forth below, effective from the date of original consumer purchase of the product. This warranty is good only to the original purchaser of the product and effective only when used in the United States, including U.S. Territories.

WARRANTY PERIOD:	HOW SERVICE IS HANDLED:
LABOR: One Year from the Date of Purchase*. **PARTS** (except as listed below): **One Year** from the Date of Purchase*. **MAGNETRON: Ten Years** from the Date of Purchase*. Replacement Units and Repair Parts are warranted for the remaining portion of the original unit's warranty period. * **Retain your Sales Receipt to prove the date of purchase.** A copy of your Sales Receipt must be submitted at the time warranty service is provided.	**Please call 1-800-243-0000 and choose the appropriate option.** (Phones are answered 24 hours a day, 365 days per year.) Please have the product type (Microwave) and your ZIP code ready. Or visit our website at: http://us.lgservice.com

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT ANY IMPLIED WARRANTY IS REQUIRED BY LAW, IT IS LIMITED IN DURATION TO THE EXPRESS WARRANTY PERIOD ABOVE. LG WILL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL, OR PUNITIVE DAMAGES OF ANY NATURE, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR PROFITS, OR ANY OTHER DAMAGE WHETHER BASED IN CONTRACT, TORT, OR OTHERWISE. Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above exclusion or limitation may not apply to you. This warranty gives you specific legal rights and you may also have other rights that vary from state to state.

THIS LIMITED WARRANTY DOES NOT APPLY TO:

- Service trips to your home to deliver, pick up, and/or install the product, instruct, or replace house fuses or correct wiring, or correction of unauthorized repairs.
- Damages or operating problems that result from misuse, abuse, operation outside environmental specifications or contrary to the requirements of precautions in the Operating Guide, accident, vermin, fire, flood, improper installation, acts of God, unauthorized modification or alteration, incorrect electrical current or voltage, or commercial use, or use for other than intended purpose.

The cost of repair or replacement under these excluded circumstances shall be borne by the consumer.

CUSTOMER INTERACTIVE CENTER NUMBERS

To obtain Customer Assistance, Product Information, or Dealer or Authorized Service Center location:	**Call 1-800-243-0000** (24 hours a day, 365 days per year) and select the appropriate option from the menu. **Or visit our website at: http://us.lgservice.com**

TO CONTACT LG ELECTRONICS BY MAIL:

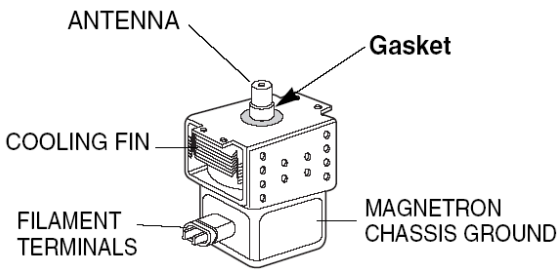
LG Customer Interactive Center
P. O. Box 240007
201 James Record Road
Huntsville, Alabama 35824

GENERAL WARNINGS and SAFETY INFORMATION

- Always unplug the oven to disassemble or repair it.
- Never operate the microwave oven when it is empty. When cooking very small amounts of food, put a glass of water in the cooking compartment.
- Do not operate the oven on a 2-wire extension cord during repair or use.
- Use proper ESD precautions when handling the PCB.
- Never put anything into the latch holes and interlock switches.
- Remove your watch before working on or around the magnetron.
- Do not operate the oven without the glass tray / turntable in place.

Be sure the magnetron gasket is properly installed around the dome of the tube whenever installing the magnetron.

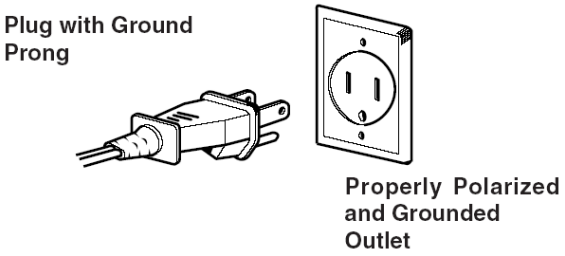
See magnetron section, page 21.



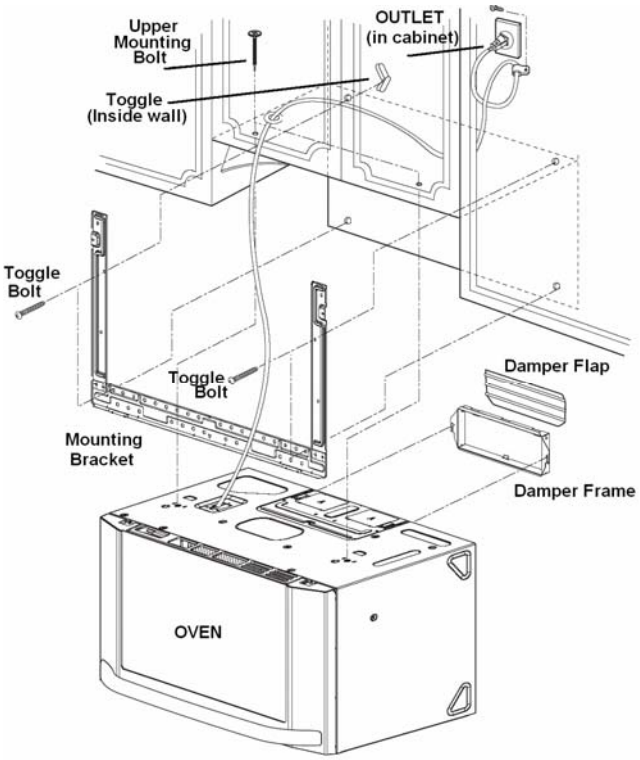
MAGNETRON

Always use a properly wired and grounded 3-wire dedicated outlet to power the oven. (120 V_{AC}, 20 A.)

Never cut the ground prong off the plug or otherwise defeat the grounding of this appliance.



OVEN INSTALLATION

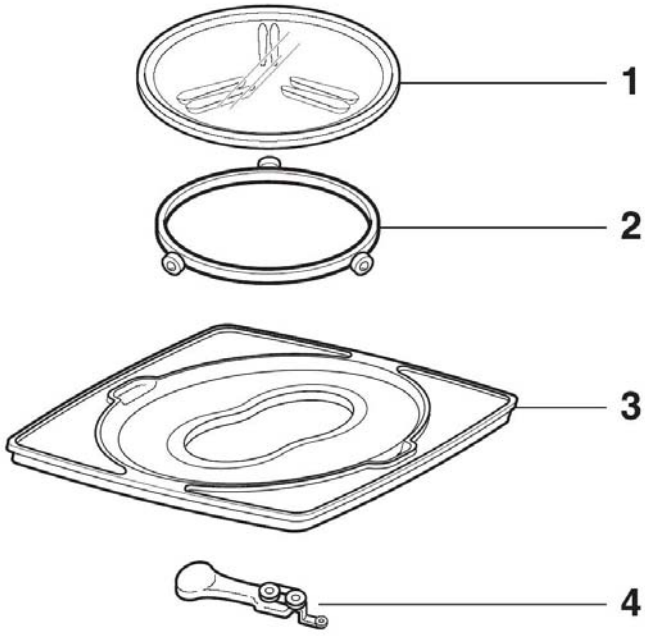


The **LMVM2277ST** must be properly installed before operation. Installation includes mounting the bracket on the wall with toggle bolts and/or lag bolts and drilling holes in the cabinet above the oven to accommodate the electric cord and the upper mounting bolts.

A template is provided for locating the holes properly.

The ventilation fan can exhaust air in any of three directions: through the back wall, through the roof, or recirculated through the charcoal filter into the kitchen. If the air is vented through a duct to the outside, the damper and flap must be installed.

TURNTABLE INSTALLATION



The turntable is a multi-part arrangement that includes a round glass tray that rotates and a rectangular glass tray that moves laterally at the same time. Smaller dishes sit on the round tray while they rotate and move laterally; larger dishes sit on the rectangular tray and move laterally.

1 Round glass tray

2 Rotating ring

3 Rectangular glass tray

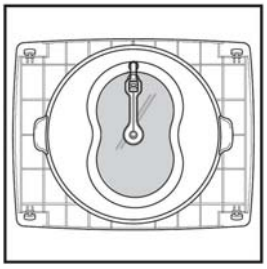
4 Turntable drive arm

Follow these steps to install the turntable components and to ensure they function correctly.

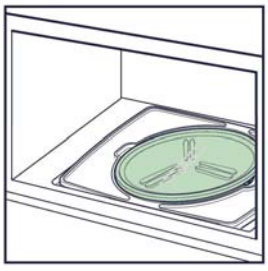
1. Install the turntable drive arm and position it securely on the drive cam.

2. Install the rectangular glass tray and ensure it slides properly.

3. Place the rotating ring on top of the rectangular glass tray.



4. Be sure the drive arm can rotate in the hollow area on the bottom of the rectangular tray.



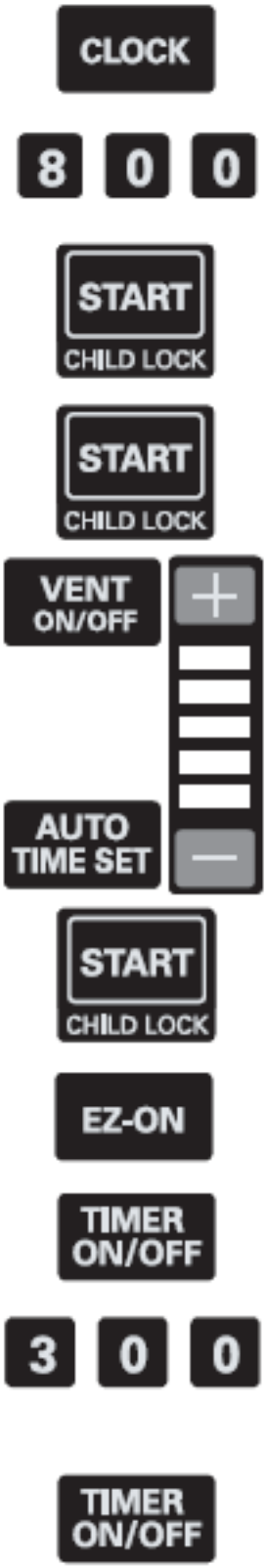
Place the round glass tray on top of the rotating ring. Put a cup of water on the turntable and operate the oven for a minute to ensure that the tray mechanism is seated properly and works as it should. There should be rotation on the turntable AND lateral motion involving the rectangular tray.

OPERATING INSTRUCTIONS

All functions are available from the control panel. Operation is similar to most other microwave ovens.

For example, to set two-stage cooking with a cook time of 3 minutes at full power and 7 minutes, thirty seconds at a power level of 70%, press **3**, **0**, **0**, and **COOK TIME** to set the 3 minutes at full power, then press **7**, **3**, and **0** to set the second cooking time of seven minutes, thirty seconds, then press **POWER LEVEL** and **7** to set the power level of the second cooking period to 70%, and then press **START**.

All other functions operate in a similar manner. See the owner's manual for complete operating instructions.



When the oven is first plugged in, or after a power failure, the display will flash the message **PLEASE SET THE TIME OF DAY**. If the time is not set, the colon (**:**) will display until you touch **CLOCK**.

To set the clock, touch **CLOCK**, the numbers (**0** through **9**) to set the time, **START**, and **START** again.

To operate the ventilation fan, touch **VENT ON/OFF**, then touch **+** or **-** to adjust the speed.

To run the fan for a set period, turn it on and set the desired speed, as illustrated above. Then touch **AUTO TIME SET** several times to increase the time before the fan is turned off.

To toggle the CHILD LOCK feature ON or OFF, touch and hold the **START/CHILD LOCK** button for 5 seconds until a beep sounds.

The **EZ-ON** button turns the oven on at full power for 30 seconds. To cook for 2 minutes, press it four times.

To use the timer without operating the oven, press **TIMER ON/OFF**, the numbers of the time to set, and **TIMER ON/OFF**.

The timer will count down and beep at the end of the set period.

POWER LEVELS

Eleven power levels are available, from 0% to 100% in 10% increments. The magnetron output is not adjustable; that is, it is either on or off. To achieve lower power levels, a relay is used to cycle the magnetron on and off. A magnetron warm-up period of two seconds is included in each ON cycle.

Power Level	Warm-up Time	On Time	Off Time
0%		magnetron is off	
10%	2 sec.	2 sec.	18 sec.
20%	2 sec.	4 sec.	16 sec.
30%	2 sec.	6 sec.	14 sec.
40%	2 sec.	8 sec.	12 sec.
50%	2 sec.	10 sec.	10 sec.
60%	2 sec.	12 sec.	8 sec.
70%	2 sec.	14 sec.	6 sec.
80%	2 sec.	16 sec.	4 sec.
90%	2 sec.	18 sec.	2 sec.
100%		magnetron is on	

Lower power levels can be used to thaw frozen items and to soften butter or margarine. Intermediate power levels are used to cook foods more delicately than using high power. 0% power can be used to insert standing time between two cook cycles, such as between defrosting and cooking, to allow the food to stand and defrost completely before beginning the cooking process.

CARE and CLEANING

Cleaning the oven is easy. Always unplug the oven before cleaning the control panel to avoid touching too many buttons at once and damaging the microprocessor.

OVEN EXTERIOR

To clean the outside of the oven, use a soft cloth and spray glass cleaner. Spray the glass cleaner onto the cloth rather than onto the oven. DO NOT USE abrasive cleanser, steel wool, scrubbing pads, gritty washcloths, rough paper towers, and those sorts of things. They can damage the finish on your oven.

OVEN INTERIOR

To clean the inside of the oven, remember that it is easiest if you wipe out the oven and clean any spatters as soon as the cooking is completed. This prevents the spatters from being baked onto the oven surfaces during subsequent cooking. Be especially careful to clean the area where the door closes and touches the frame of the oven.

For stubborn soils inside the oven, put a large container of water in the oven and run the oven for 10 minutes. (A 2-cup microwave-safe glass measuring cup works well for this.) The steam will soften soils and allow them to be wiped away with a damp towel. If you cut up a lemon and put it into the water during the cooking, your oven and entire kitchen will be citrusy fresh,

GREASE FILTERS

The grease filters (on the bottom of the oven) should be removed and cleaned monthly.

Push the tab backward and allow the filters to drop out of their holders. Clean them by swishing them in hot, soapy water and rinsing them. Shake them to dry them and replace them in their holders.

DO NOT OPERATE the oven without the grease filters in place.

CHARCOAL FILTER

If the oven is vented to the outside, the charcoal filter is not used. Leaving it in place will not cause a problem. If the oven recirculates the air back into the kitchen, the charcoal filter should be replaced every 6 ~ 12 months. It is not washable and must be replaced. DO NOT OPERATE the oven without the charcoal filter in place, unless, of course, the oven is vented to the outside.

The charcoal filter part number is **5230W1A0003A**.

Remove the two screws at the top of the oven housing. (These are the two middle screws.) If the oven is properly installed, these screws will be accessible in front of the edge of the cabinet.

Remove the wire cover. It is a small plastic guide that fits with the vent grille on the left end. It can be pulled out through the top when the door is closed.

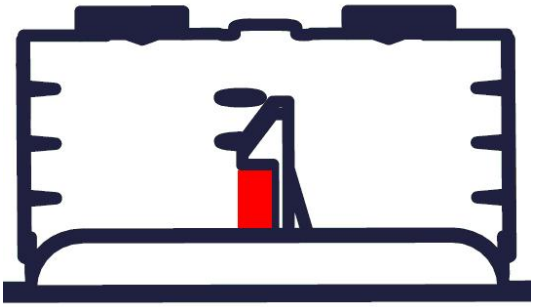
Open the door and tip the vent grille forward. Lift it out to remove it.

Remove the old filter and replace it with a new one. It is not reusable.

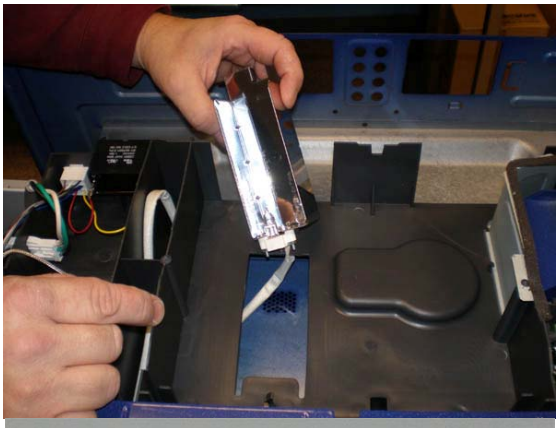
OVEN LIGHT REPLACEMENT

To replace the oven cooking cavity light, remove the vent grille screws (the two middle ones) and take out the wire cover. Open the door and tip the vent grille forward. Lift it out to remove it. (This procedure is illustrated on the previous page.)

Push the metal tab of the lampholder off the plastic tab and pull the lamp and holder out. Replace the bulb and reinstall the holder.

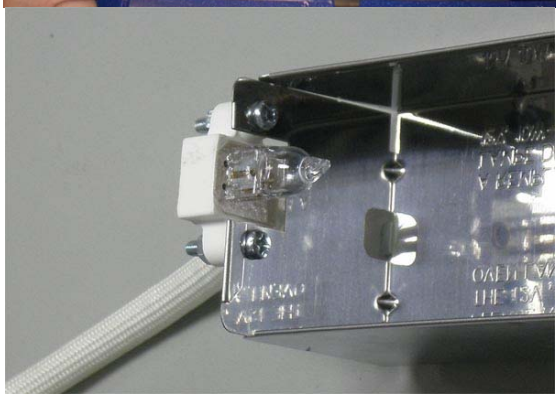


The lampholder tab rests against a plastic tab on the oven vent housing. It is a simple snap fit. Push it aside to remove or replace the lamp assembly.



Lift out the lamp holder, which includes the bulb and the socket, which is attached to the reflector with two bolts.

Do not touch the bulb with your fingers. Use a clean, protective cloth or paper towel.

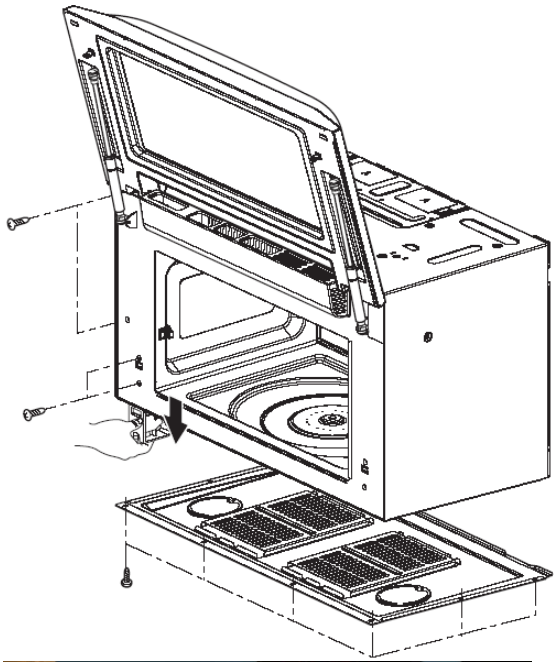


The bulb can be replaced by pulling it out and replacing it with a new one. The bulb is not equipped with a filament anchor, so there is no top or bottom.

The socket/pigtail is attached to the lamp holder by two bolts. The socket need not be removed to change the bulb.

DISASSEMBLY and REPAIR

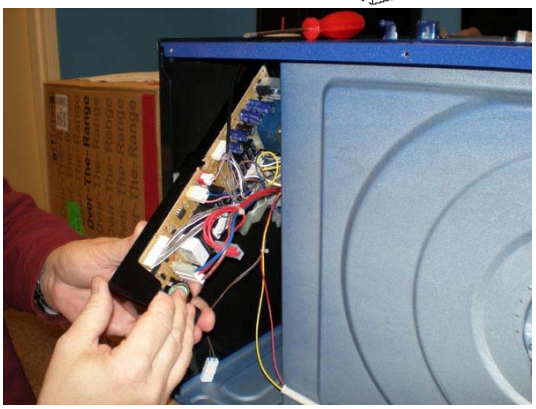
POWER BOARD and MAIN BOARD



The main board and power board can be serviced without dismounting the oven.

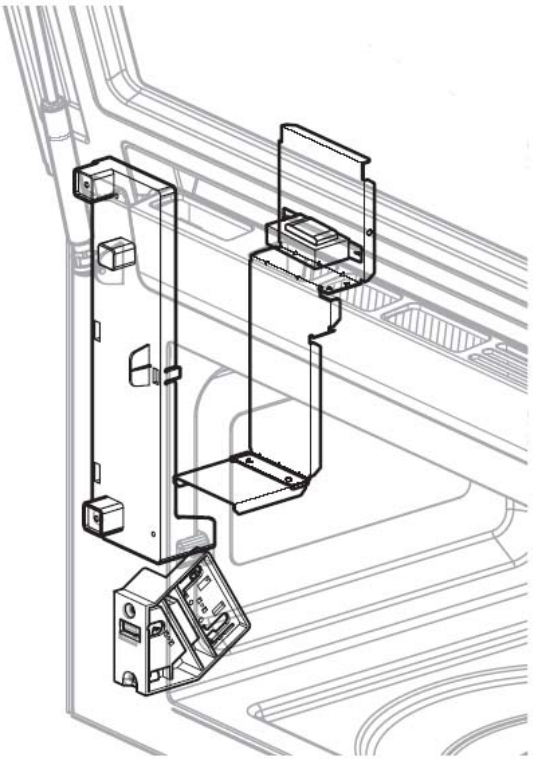
Remove the screws around the perimeter of the base plate. Disconnect the wiring harness for the lights and set the base aside.

Remove the four screws toward the bottom of the face plate on the left side. Pull the latch board down and push it aside.



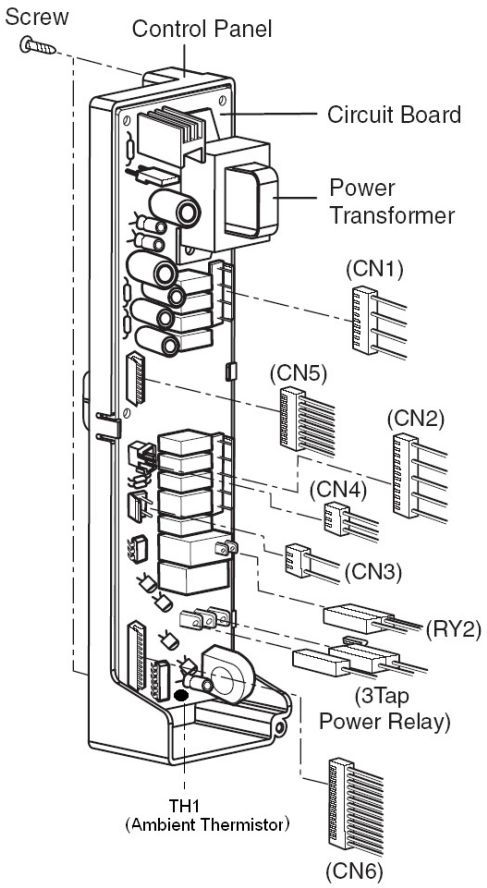
Release the main board and pull it down. You'll have to roll it to the right a little bit to make it clear easily.

Note: The photo is in the lab, but this can be achieved while the microwave is mounted on the wall.



This drawing shows the location of the main board (upper item) and the ventilation duct inside the microwave oven case.

The latch board is the lower item.



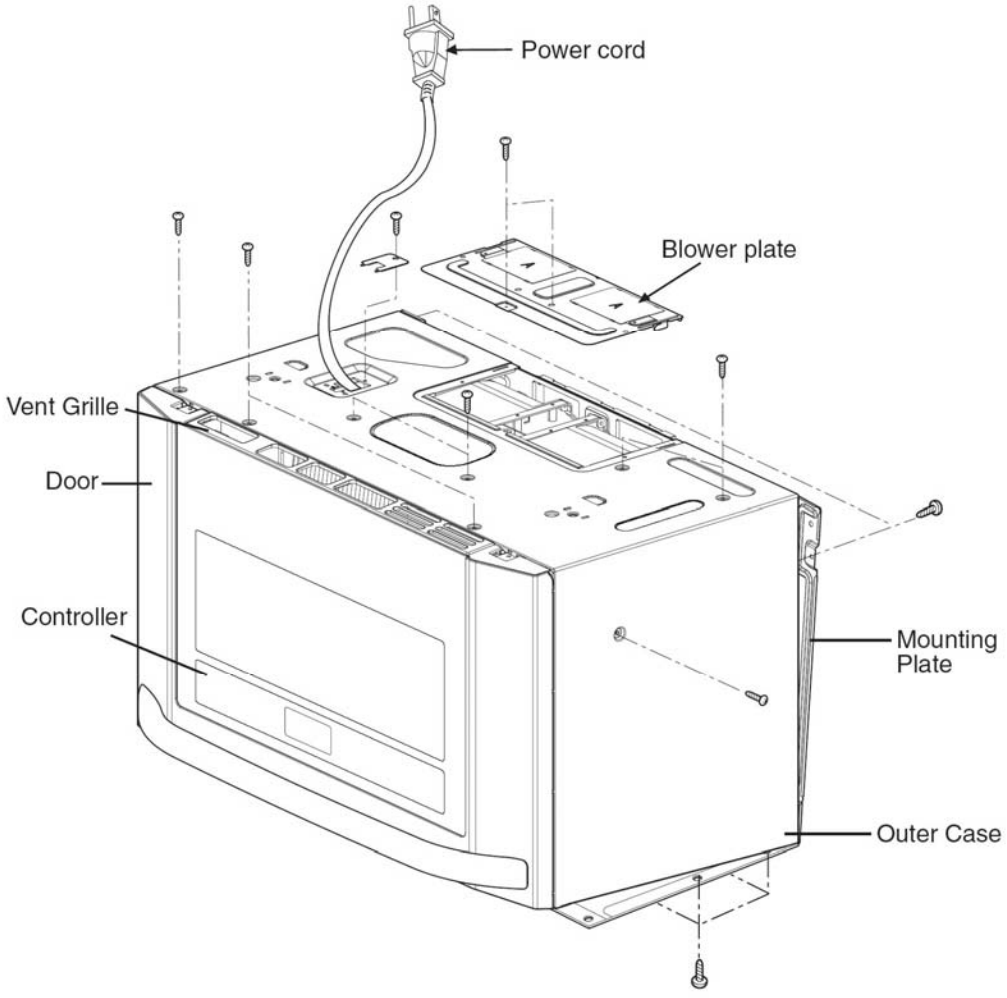
Remove the wires and connectors from the main board.

Remove the screws that hold it in the case to change the board.

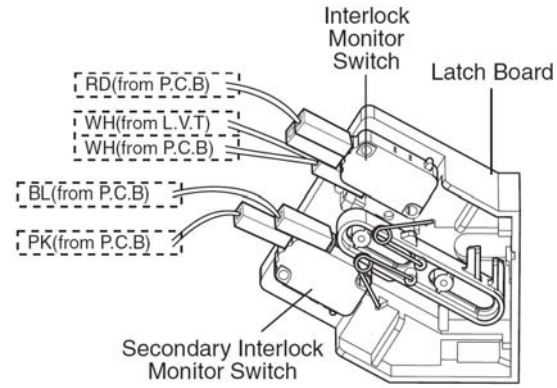
OUTER CASE REMOVAL

These instructions assume you are removing, replacing, or servicing an oven that has been installed. If it is a new oven, be sure to remove two screws and the mounting bracket from the back of the oven before proceeding.

- Remove the two vent grille screws.
- Remove the four screws securing the oven case to the oven. (Four on the top, one on the right side.)
- Remove two screws on each side of the base plate.
- Remove the four screws holding the outer case to the back of the oven.
- Lift the outer case carefully from the oven. Store it to prevent damage while you are working on the oven.



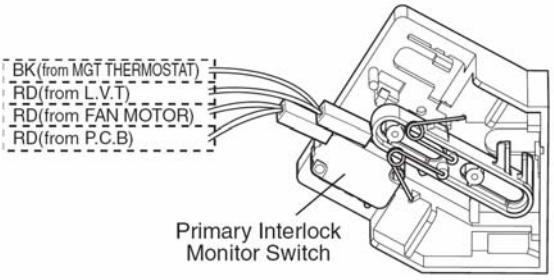
DOOR INTERLOCK SWITCHES



Disconnect the interlock switches.

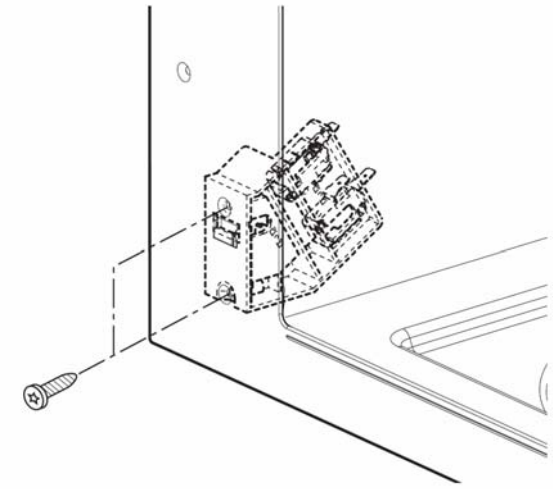
Remove the two screws attaching the switch to the front of the oven. (You'll need a Torx® T-20T (Tamperproof) bit.

After replacing the switch, perform a microwave leakage check.
(See page 33.)

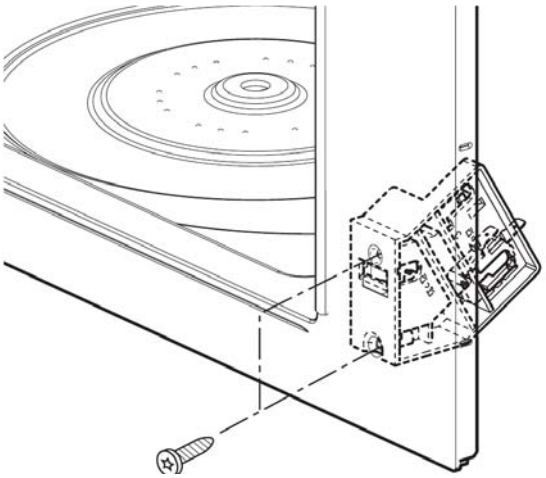


The connectors are keyed to prevent improper connection. It is still a good idea to check the wire colors, especially where there are multiple connectors.

LEFT SIDE SWITCH



RIGHT SIDE SWITCH



INTERLOCK SWITCH CONTINUITY TEST

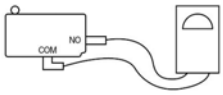
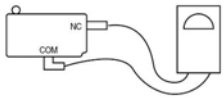
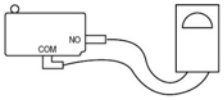
The door interlock switches should click audibly when the door is opened or closed. If the latches do not activate the switches properly, they can be adjusted.

PRIMARY and SECONDARY SWITCHES

Disconnect the wire lead from the switch. Connect an ohmmeter to the COM (common) and NO (normally open) terminals of the switch. With the door open, the meter should indicate an open circuit. Closing the door should indicate a closed circuit. (See chart, below.)

MONITOR SWITCH

Disconnect the wire lead from the switch. Connect an ohmmeter to the COM (common) and NC (normally closed) terminals of the switch. With the door open, the meter should indicate a closed circuit. Closing the door should indicate an open circuit. (See chart, below.)

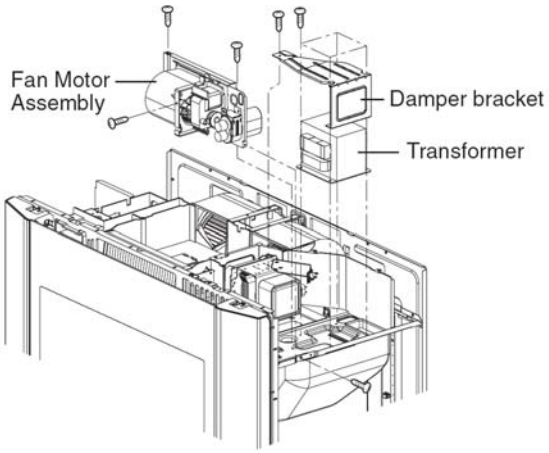
COMPONENTS	TEST PROCEDURE		RESULTS	
SWITCHES (Wire leads removed) Indicates Switch Contacts Are Open Indicates Switch Contacts Are Closed 	Check for continuity of the switch with an Ohmmeter		Door open	Door closed
	Primary Switch			
	Monitor Switch			
	Secondary Switch			
	NOTE : After checking for the continuity of switches,make sure that they are connected correctly.			

WARNING! For continued protection against microwave emission, replace switches ONLY with identical replacement parts.

PRIMARY	Type SZM-V16-FA-63 –or-- VP-533A-OF –or-- V5230Q
SECONDARY	Type SZM-V16-FA-63 –or-- VP-533A-OF –or-- V5230Q
MONITOR	Type SZM-V16-FA-62 –or-- VP-532A-OF –or-- V5220Q

NOTE! After repairing the door, interlock system, or switches, these continuity tests must be performed.

MAGNETRON REMOVAL and REPLACEMENT



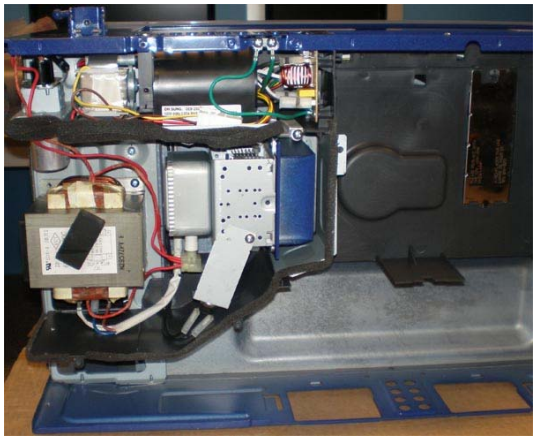
Remove the outer case.
(See page 18.)

Remove the damper bracket.

Disconnect the transformer lead wire.

Remove the four screws securing the transformer.

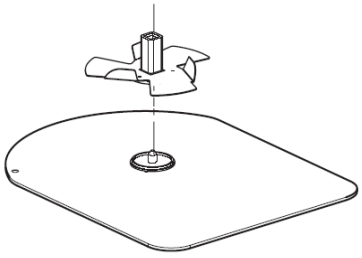
Remove two screws securing the fan motor.



Remove four screws securing the magnetron and lift it out carefully.

When removing or replacing the magnetron, ensure the woven metal gasket is undamaged and properly positioned.

STIRRER FAN and COVER



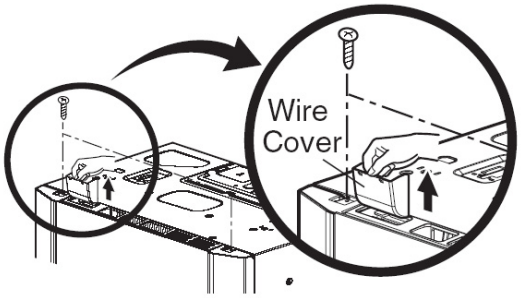
The stir fan cover is in the top of the oven. It is held in place by one screw and three tabs. This cover must be in place to operate the microwave oven safely.

Remove the screw and pull the cover out of the tabs, being careful not to bend or break the cover.

The stir fan presses onto the shaft.

The cover is secured by three tabs and a single screw.

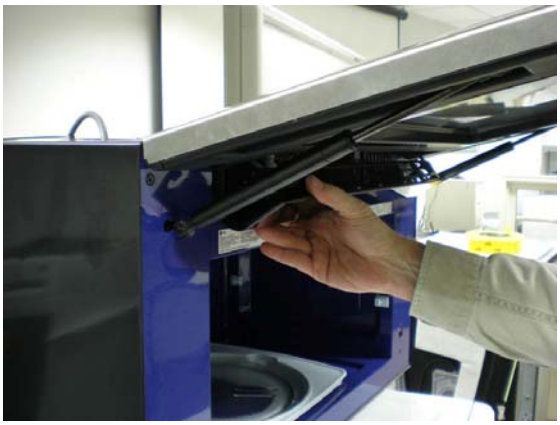
DOOR REMOVAL



Remove the two vent grille mounting screws.

Remove the door hinge screws.

Remove the wire cover and open the hinge covers.

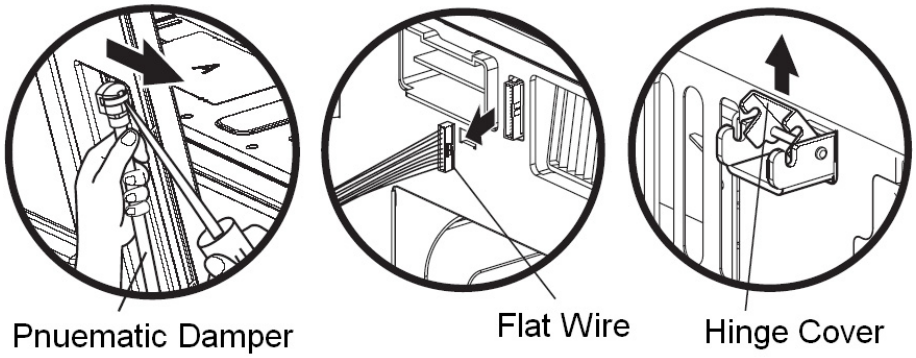


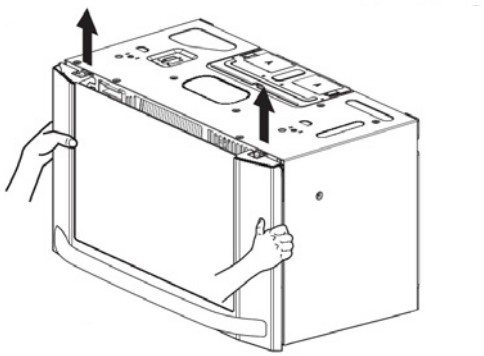
Open the door.

Remove the vent grille.

Disconnect the two flat cables at the face plate connectors.

Use a small screwdriver to remove the clip on the end of the pneumatic damper and take the spring out of the oven. USE CAUTION, because the damper could expand without notice.

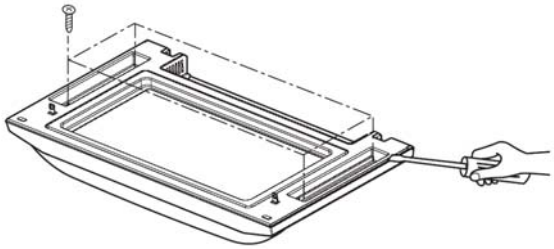




Lift the door off the hinges and remove it. Set it on a protective surface, like a blanket, to prevent scratches or damage.

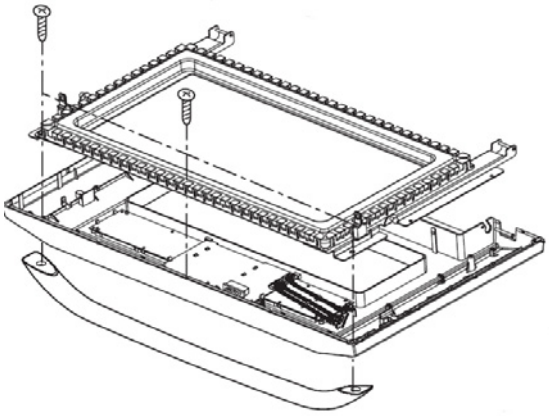
When replacing the door, always check the interlock switches and perform a microwave leakage test.
(See page 33.)

DOOR DISASSEMBLY



Remove the four screws securing the choke cover to the door.

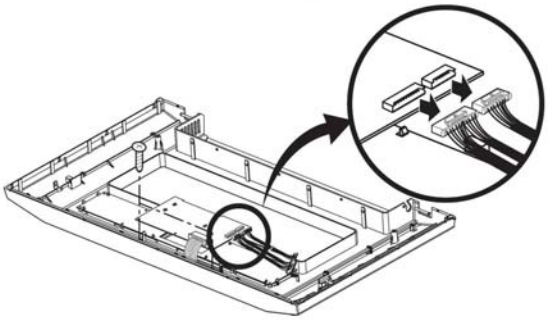
Separate them carefully using a small screwdriver or a knife.



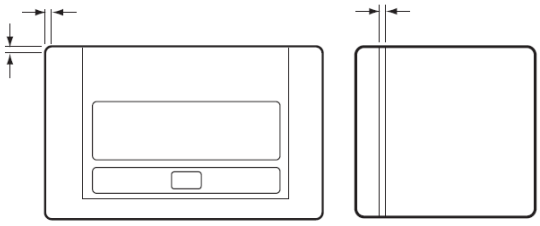
Remove the two screws securing the handle.

Remove the door frame.

Remove the two screws securing the PCB (Printed Circuit Board.)



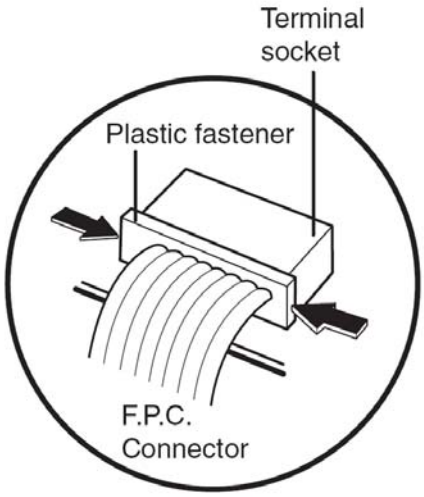
Disconnect the flat plastic connector. (See page 24.)



When replacing the door, adjust it to be parallel to the chassis. There should be no play between the inner door surface and the oven frame. If the door is not mounted properly, microwaves may leak between the door and oven or the monitoring and safety switches will prevent usage.

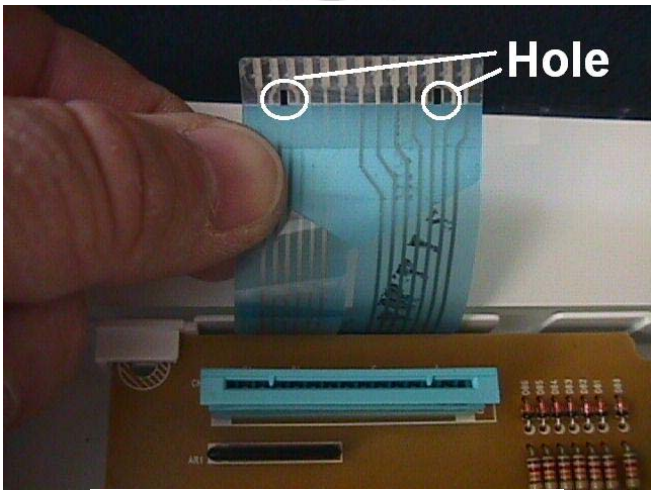
Always perform a microwave leakage test whenever the door is adjusted or repaired.

FLAT PLASTIC CONNECTOR

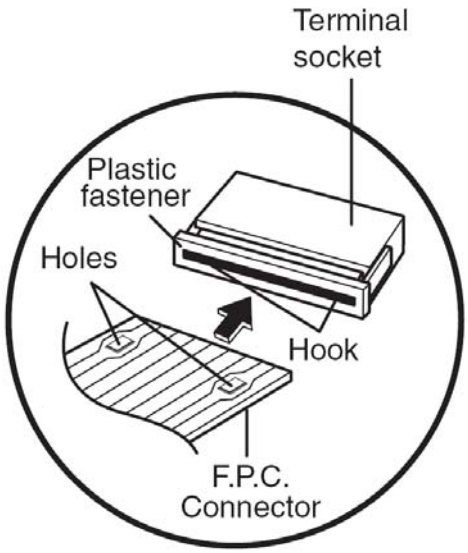


The flat plastic connector (FPC) is opened and closed by moving the plastic slide at the top to release or secure the flat cable.

To release the cable, pull the latch away from the connector.



Lift the flat cable out. It is held in place by two hooks that fit into the two square holes on the cable.



To replace the flat cable, be sure the latch is pulled up (away from the connector.)

Insert the flat cable and secure the hooks in the two square holes.

Press the latch into place and gently tug on the cable to be sure it is secure.

VENTILATION FAN MOTOR REPLACEMENT

If the oven has not been installed, be sure the mounting bracket has been removed from the back of the oven.

Remove the two screws securing the blower plate cover. (One on the top and one on the back.)

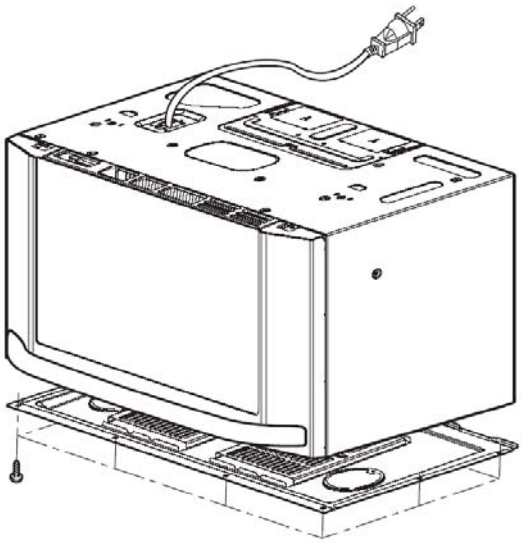
Lift the motor out and turn it to face the proper direction (front, top, or back) for venting.

Replace the screws in the top and back to secure it against vibration.

Replace the top plate (unless you are venting the oven through the roof.)

Attach the adapter and duct work for venting.

TURNTABLE MOTOR REPLACEMENT (With Oven Installed)



Remove the glass tray and all other parts of the turntable assembly.

Pull the turntable drive arm off the motor shaft.

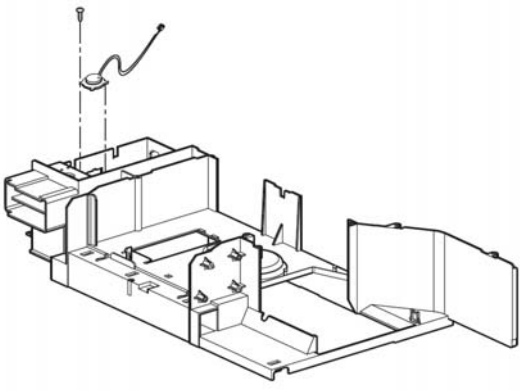
Remove the base plate by removing eight screws along its perimeter.

Disconnect the light assembly cable and set the base on a protective surface like a blanket or pad.

The turntable motor is attached to the base with a tab and a screw.

Replacement is the reverse of these steps.

HUMIDITY SENSOR



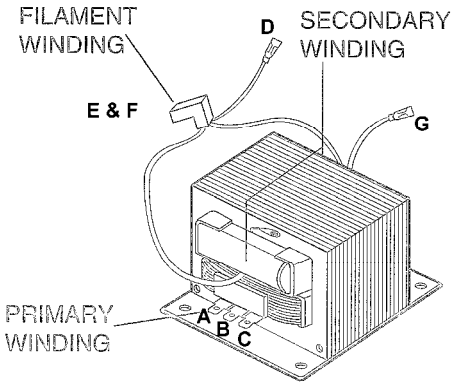
With the outer case removed, remove one screw and lift out the humidity sensor.

Unplug the connector at the main board and replace the defective sensor.

Replacement is the reverse of these steps.

COMPONENT TEST PROCEDURES

TRANSFORMER TEST



To test the transformer, remove all leads to take it out of the circuit. Measure the resistance between the following points:

Meter scale Rx1

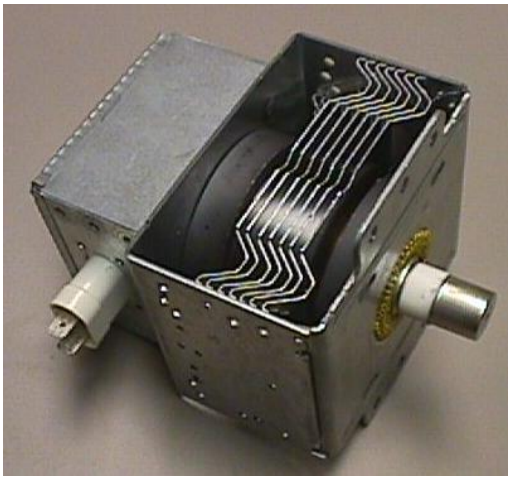
Primary (A & B) – High	0.2 ~ 1.0 Ω
Primary (A & C) – Low	0.2 ~ 1.5 Ω
HV Secondary (G & GND)	50 ~ 120 Ω
Filament (E & F)	0.5 ~ 2.0 Ω

Meter scale Rx1000

Primary to ground	Normal = infinity
Filament to ground	Normal = infinity

Lead D connects to the High Voltage Capacitor (diode side).

MAGNETRON TEST



To test the magnetron, remove the connector to take it out of the circuit.

Measure the resistance between the following points:

Meter scale Rx1

Filament terminals	> 1 Ω

Meter scale Rx1000

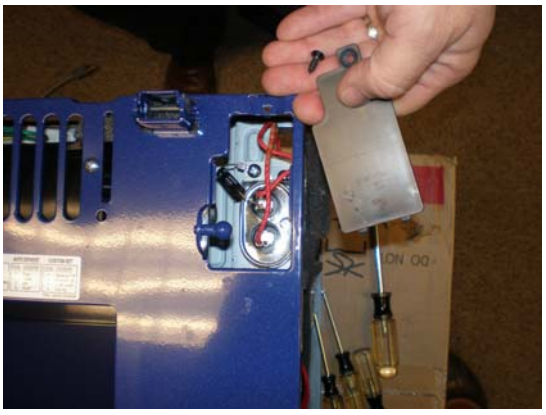
Filament to chassis	Normal = infinity

CAPACITOR

Remove the wire leads. They may be equipped with press-tab releases. Measure the resistance between the following points:

Meter scale Rx1000
Terminal to terminal
Normally indicates several ohms, then gradually drifts toward infinity.
Terminal to case
Normal = infinity
The capacitor can be serviced while the oven is still mounted.

Remove the door. (See page 22.)

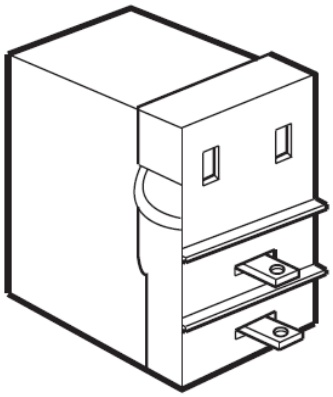


Remove a single screw and take off the cover that covers the capacitor.

Installed correctly, the filament lead (3 V_{DC}) and the high voltage diode are attached to the top terminal and the high voltage lead is attached to the bottom terminal. MARK THESE at disassembly to avoid incorrect re-assembly.

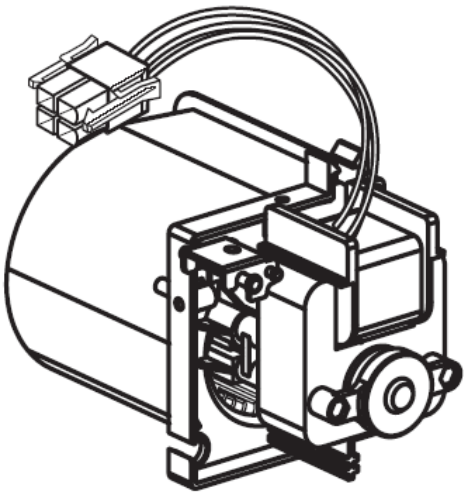
The capacitor can be removed through this opening by releasing the mounting bracket (one screw at the top) and pulling the entire assembly out through the access hole.

RELAY



Test the relay by removing its connector and measuring the continuity between the terminals. Operate the oven for 1 minute at power level 5 (50%). The relay should energize for 12 seconds and release for 10 on a continuous cycle. You can check the relay more thoroughly by testing more than one power level. See the chart on page 12.

FAN MOTOR



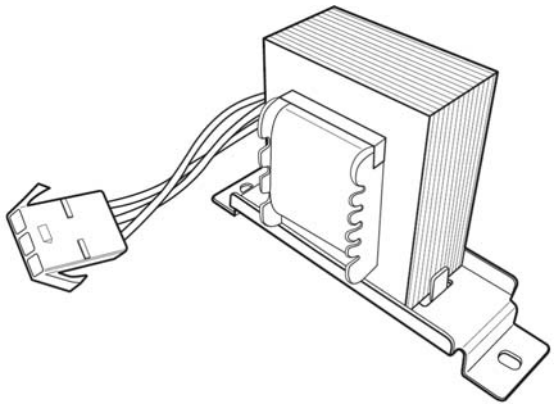
Unplug the fan connector and measure the resistance between the terminals.

Terminal A	Red
Terminal B	Brown
Terminal C	Yellow

A ~ C	12 ~ 16 Ω
A ~ B	9 ~ 23 Ω

Other readings or infinite resistance indicates a motor failure.

LOW VOLTAGE TRANSFORMER

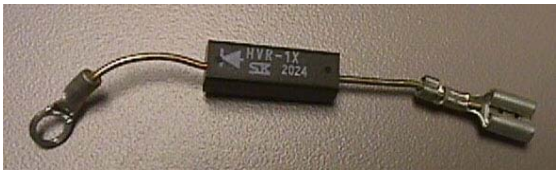


Unplug the transformer connector and measure the resistance between the terminals.

Terminal A	Red
Terminal B	Black
Terminal C	White

A ~ C	18 ~ 30 Ω
A ~ B	18 ~ 30 Ω

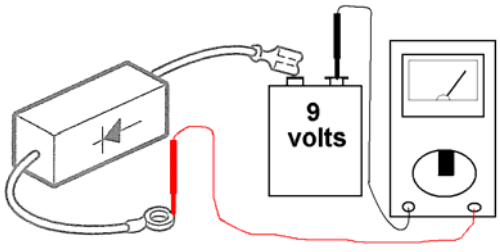
HIGH VOLTAGE DIODE



Measure the continuity in both directions using meter scale Rx1000.

Forward: Normal = continuity
Defective = infinity

Reverse: Normal = infinity
Defective = continuity



CAUTION! Be sure to discharge the capacitor before attempting to disconnect it or testing the diode!

Set the meter for $VOLTS_{DC}$ and connect the diode in series with a 9-volt battery. Test in both directions. The diode should pass current in one direction but not the other.

The simplest solution is to replace it with a known good diode.

This photo shows the diode connected with +9 V_{DC} applied to the cathode. The meter reads 0.00 V_{DC} because the diode is blocking the flow.

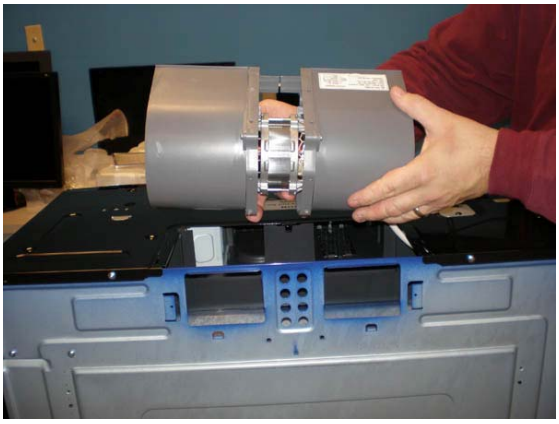
This photo shows the diode's forward bias with +9 V_{DC} connected to the anode.

TURNTABLE MOTOR

Remove the connector and measure the resistance across the terminals using meter scale Rx1000.

Normal = 2.3 ~ 3.5 kΩ
Defective = any other reading

VENTILATION FAN / MOTOR



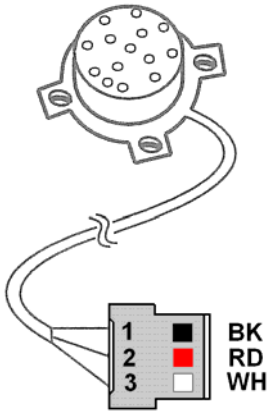
Unplug the connector and read the resistance between the various terminals using meter scale Rx1.

NORMAL:

TURBO	Blue & Black 4 ~ 20 Ω
HIGH	Blue & White 19 ~ 35 Ω
MEDIUM	Blue & Gray 26 ~ 42 Ω
LOW	Blue & Brown 34 ~ 50 Ω

DEFECTIVE: Infinity

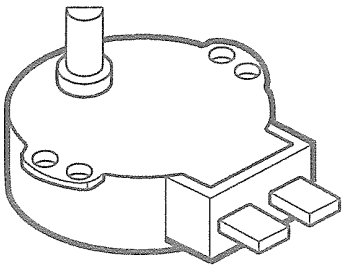
HUMIDITY SENSOR



The humidity sensor can be tested. Unplug the three-wire connector to the sensor at the circuit board end. Set your ohm meter to Rx1000. The resistance should be as indicated on the table, within 10%. Infinite resistance or a dead short indicates a sensor failure.

1 and 3 (Black & red)	6 kΩ
2 and 3 (Red & white)	3 kΩ
1 and 2 (Black & white)	3 kΩ

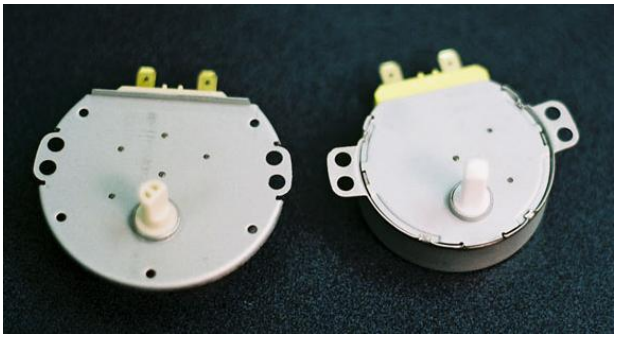
STIRRER FAN MOTOR



Remove the connector and measure the resistance across the terminals using meter scale Rx1000.

Normal = 120 ~ 135 Ω
Defective = any other reading

(See page 21.)



The turntable (left) and stirrer fan motors (right) look similar but are not interchangeable.

The differences include rotation speed and shaft shape, input voltage, length, and size.

MICROWAVE LEAKAGE TEST PROCEDURE

If the oven is operational, it should be checked for microwave leakage before servicing begins. The standard for microwave emission is 5mW/cm^2.
LG's voluntary standard is much lower at 1mW/cm^2. A microwave leakage test MUST be performed after the oven is serviced for any reason.

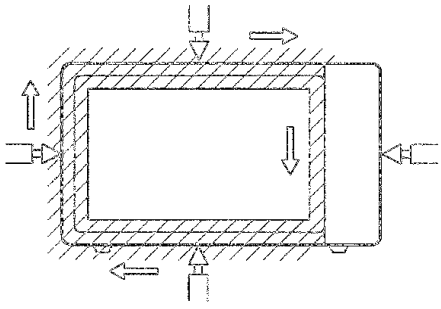
Test for microwave emission using the following procedure.

Equipment:

- microwave survey meter, such as a Holaday HI-1500 or HI-1501 or a Narda 8100 or 8200
- non-conductive, 600 cc beaker (glass or plastic) approximately 3½ inches (900 mm) in diameter
- glass thermometer 32° F to 212° F (0° C to 100° C) in 1° graduations

Procedure:

- Pour 275±15 cc of water into the beaker
- Verify the temperature to be 68° F ±9° F (20° C ±5° C)
- Set the leakage meter to 2,450 MH_z
- Use the 2-inch (5 cm) spacer
- Operate the oven at high (maximum) output
- Check for microwave emissions by holding the probe perpendicular (a 90° angle) to the surface and scanning less than 1 inch (2.5 cm) per second in the area shown in the diagram.



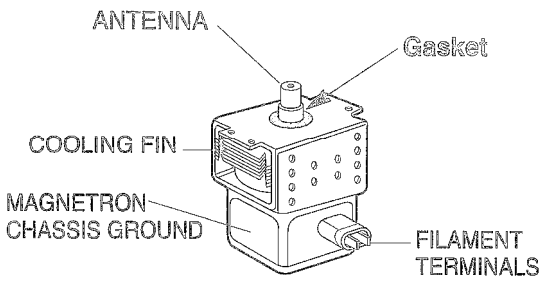
MICROWAVE POWER – TRADITIONAL METHOD

Magnetron output and microwave power tend to deteriorate with age. To determine whether an oven's output is within specification, use the following formula and procedure.

FORMULA

$$P = \frac{4.187\ Mw\ (T2-T1) + 0.55\ Mc\ (T2-T0)}{t}$$

P	=	microwave power output in watts
Mw	=	mass of the water, in grams
Mc	=	mass of the container, in grams
T0	=	ambient temperature, in °C
T1	=	initial temperature of the water, in °C
T2	=	final temperature of the water, in °C
t	=	heating time, in seconds, excluding the magnetron filament warm-up time



After inspecting or servicing the magnetron, ensure the gasket is properly installed around the dome of the tube.

Check for microwave leakage following the procedure on page 33.

MICROWAVE POWER - ALTERNATE METHOD

Several methods have been used to measure the output of microwave ovens over the past years. In order to assure accuracy and consistency among the testers the following method is recommended. The procedure is to measure and record the average Celsius temperature rise of 2 liters of water cooking on High Power for 2 minutes. Then multiply the temperature rise by 70 to determine the power output.

REQUIREMENTS

Microwave Power Output testing requires the ability of the technician to measure water temperature in degrees Celsius (ºC), to have two (2) - one (1) liter plastic measuring beakers, and a voltmeter that is capable of measuring 120 V_{AC} with ± 1 volt accuracy.

EQUIPMENT

Celsius thermometer
Two – 1-Liter Plastic Beakers (Plastic does not absorb heat energy like glass!)
AC Voltmeter

TEST PROCEDURE

1. Fill both of the 1-liter beakers to the 1000 ml (1 Liter) measuring line.
2. Stir the water and determine that the tap water is cooler than 25º C; record the temperature.
3. If the temperatures differ, add the 2 numbers and divide by 2 to get an average.
4. Place the 2 beakers side-by-side in the microwave making sure that the beakers are as near the center as possible. If a shelf or rack is used, place the rack at a level that will center the beakers in the oven cavity and place the beakers on the rack.
5. Set the microwave oven for **HIGH** (highest or 100%) power level and set the cook time for 2 minutes. Press the **START** button and heat the water for 2 minutes.
6. After heating for 2 minutes, immediately remove the beakers, stir the water with the thermometer, and record the water temperature of both beakers.

   Note: The average temperature rise of the water in the two beakers must be determined, because of possible uneven power distribution within the oven cavity. This could affect the ending temperatures of both beakers water. If the water temperature in the 2 beakers differs, add the two Celsius numbers and divide by 2 to get the average ending temperature.

Example:

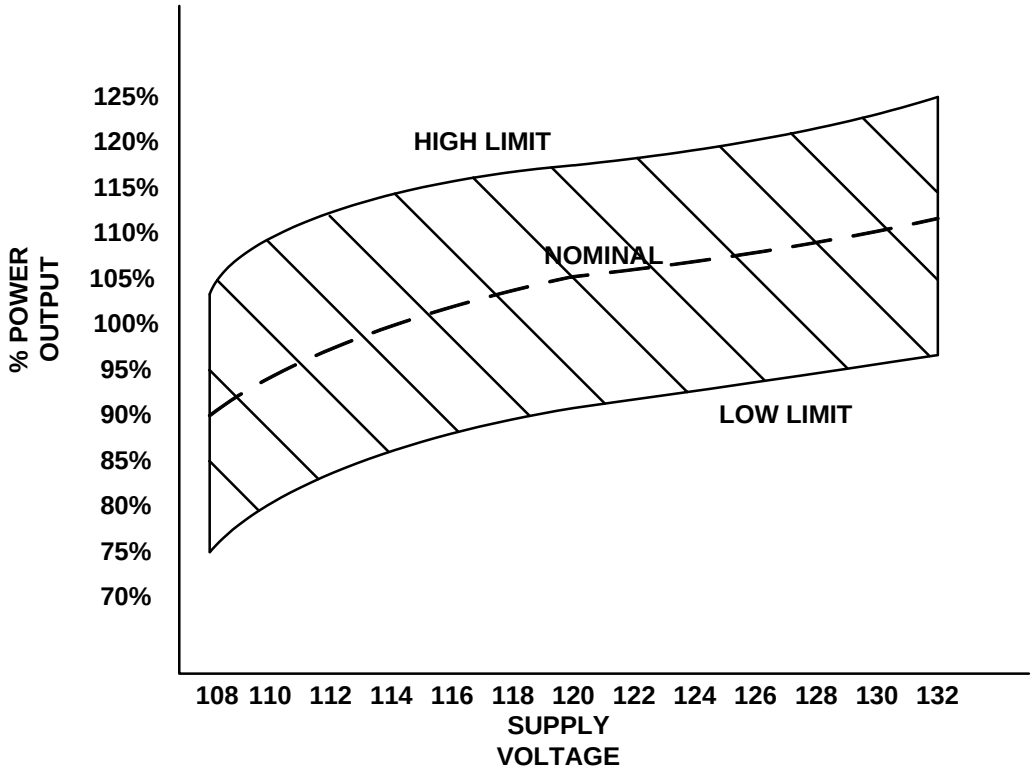
Starting Average Temperature of the 2 beakers = 20º C
Ending Temperature of the 1st beaker = 36.5º C
Ending Temperature of the 2nd beaker = 32.5º C

1st Beaker	36.5° C
2nd Beaker	32.5° C
Total	69.0° C

Average the sum by dividing by 2 69 ÷ 2 = 34.5° average temperature
Subtract the starting Temperature: - 20° starting temperature
14.5° temperature rise

7. To determine the power output multiply the temperature rise by 70.
   Example: 70 x 14.5 = 1015 watts

8. The output power of a microwave oven is greatly affected by the voltage under load of the AC power supply. Measure the voltage under load at the wall receptacle where the oven is powered and operating. The following chart shows the percentages of full power that are within limits at voltages from 108 V_{AC} to 132 V_{AC}.



Note:

Power output measurements should never be made on microwave ovens operating on less than 108 V_{AC}. Below this point the power output drops sharply in an unpredictable manner. Likewise, operating an oven at voltages greater than 132 V_{AC} should be avoided as damage to components may occur due to excessive electrical pressure.

Example:

A 1,000 watt oven operated at 114 V_{AC} would be within limits at any point between 85% and 112% of the rated power.

85% of 1000 = 850 watts
112% of 1000 = 1120 watts

Therefore, the oven would be nominal (normal) if the output power was between 850 watts to 1120 watts.

RESULTS AND CORRECTIONS

When the power output measured falls outside the nominal (normal) range on the chart, take the following steps:

1. Verify operation or rotation of the waveguide stirrer.

2. Disconnect power, discharge the high voltage capacitor, and check the high voltage transformer.

    a. A layer short circuit of the high voltage transformer may cause a low power output.

    b. If burned places are found in the high voltage transformer and a smell of burning insulation is sensed, replace the high voltage transformer.

3. If no other parts are defective and line voltage under a load is within tolerance, replace the magnetron and retest!

CHECKOUT PROCEDURES

BLOWN FUSE

PROBLEM	SOLUTION
Fuse blows immediately when door is closed.	Improper operation of primary and secondary interlock switches and/or monitor switch. Check and adjust as necessary.
Fuse blows immediately when door is opened.	
Fuse blows immediately when **START** is pressed with door closed.	Malfunction of high voltage transformer circuit, including transformer, diode, capacitor, magnetron, blower motor, or main board.

MAIN PCB (Printed Circuit Board)

The following symptoms indicate a defective main board:

1. Input current of more than 20 amps.
   If the input current is more than 20 amps, check the magnetron and related wiring.
   If the input current is less than 0.5 amps, there is no input to the high voltage transformer.

2. START fails but high voltage, interlock switches, door sensing, and relay check good.

3. Oven operates continuously with a normal relay.

4. Buzzer sounds continuously or fails to sound.

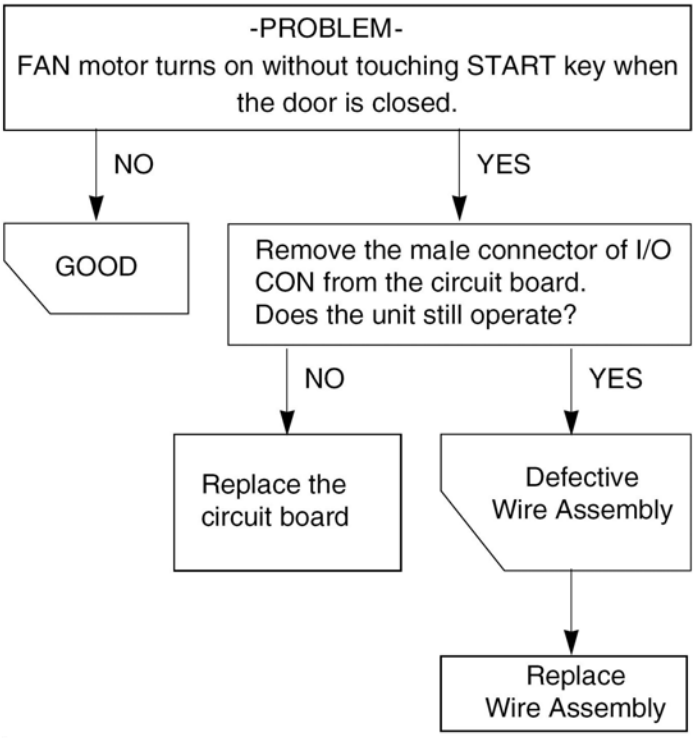
5. Segments of the LED display fail to light, light continuously, or light when they should not.

6. Incorrect numbers or letters appear in the display.

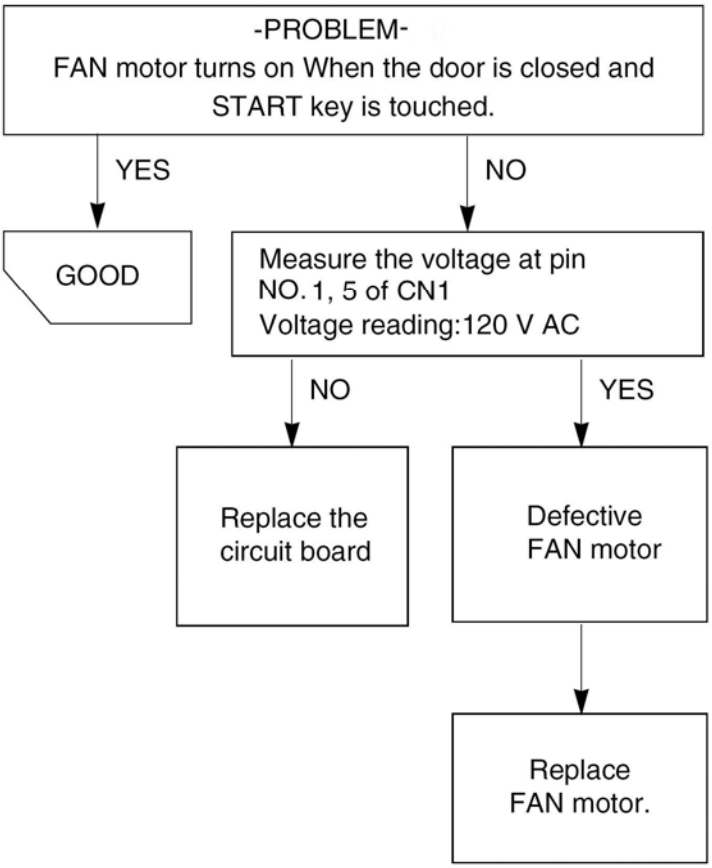
7. Clock fails to keep time accurately.

RELAY

Fan turns on when door is closed but **START** is not pressed.

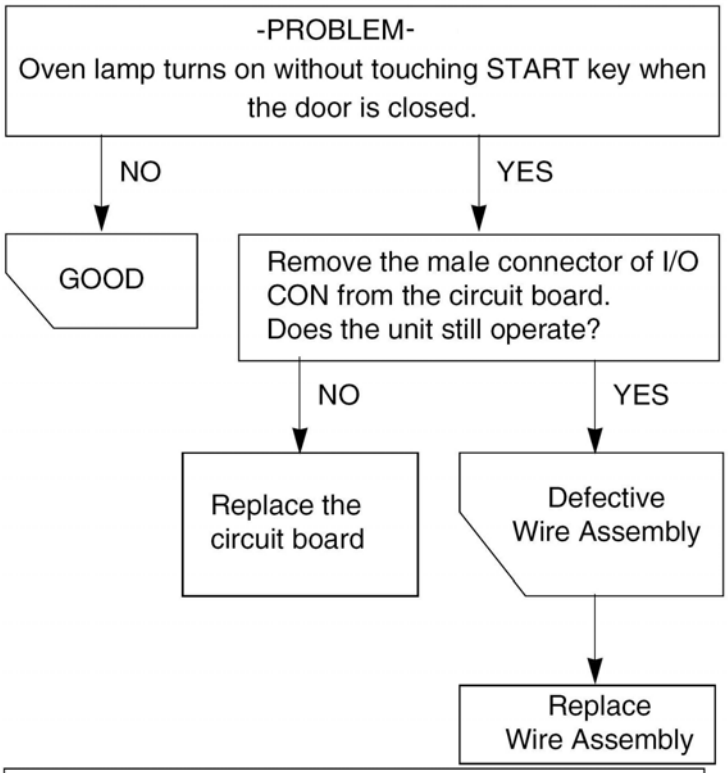

-PROBLEM-
FAN motor turns on without touching START key when the door is closed.
NO
YES
GOOD
Remove the male connector of I/O CON from the circuit board. Does the unit still operate?
NO
YES
Replace the circuit board
Defective Wire Assembly
Replace Wire Assembly

Fan does not turn on when door is closed and **START** is pressed.

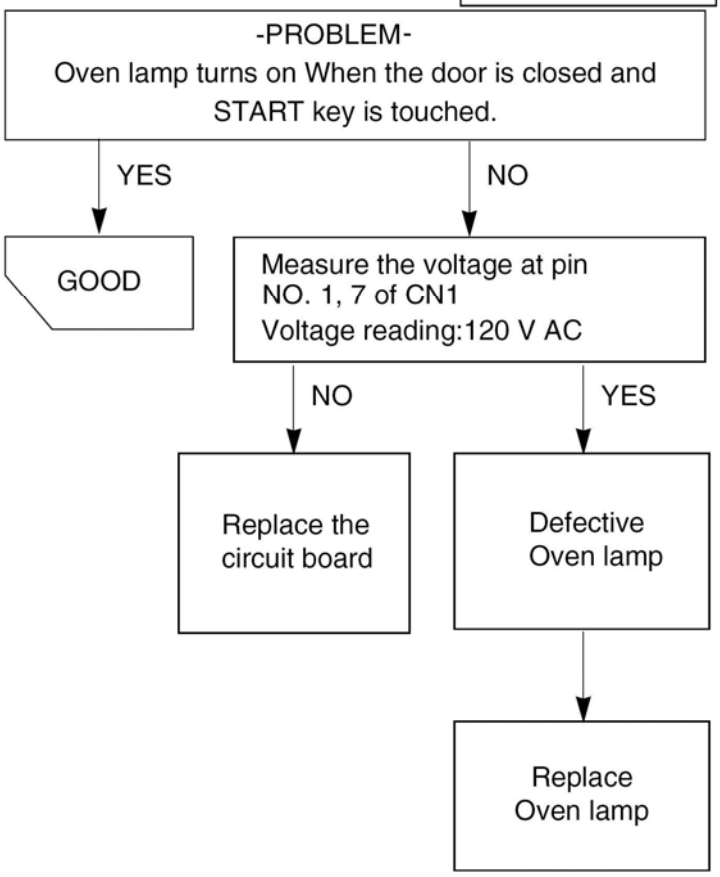

-PROBLEM-
FAN motor turns on When the door is closed and START key is touched.
YES
NO
GOOD
Measure the voltage at pin NO. 1, 5 of CN1 Voltage reading:120 V AC
NO
YES
Replace the circuit board
Defective FAN motor
Replace FAN motor.

RELAY, continued

Oven lamp turns on when door is closed without pressing **START**.



Oven lamp does not turn on when door is closed and **START** is pressed.



TROUBLESHOOTING FLOW CHARTS

Before starting the troubleshooting charts, check to see if the oven is operable.

For display problems, use charts **A**, B, and **C**.

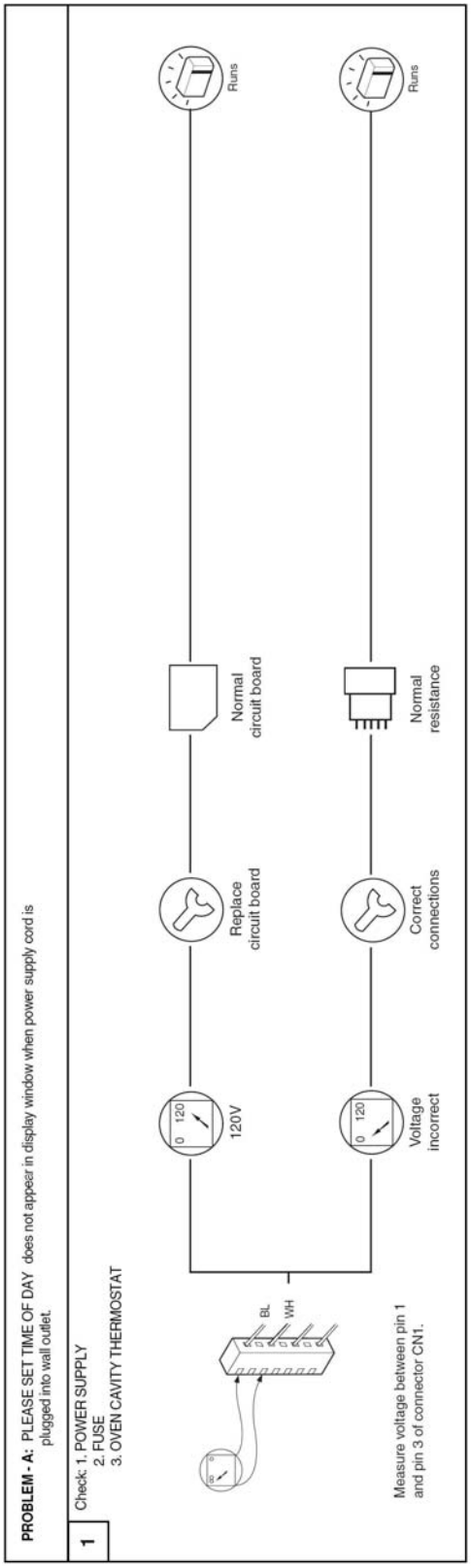
If the oven does not heat, try charts **D** and **E**.

If the ventilation fan does not operate, use chart **F**.

CHART A

(NO POWER)

Check connector **CN1** on the main board. Reading across pins **1** and **3**, (blue wire and white wire) the voltage should be 120 V_{AC}.

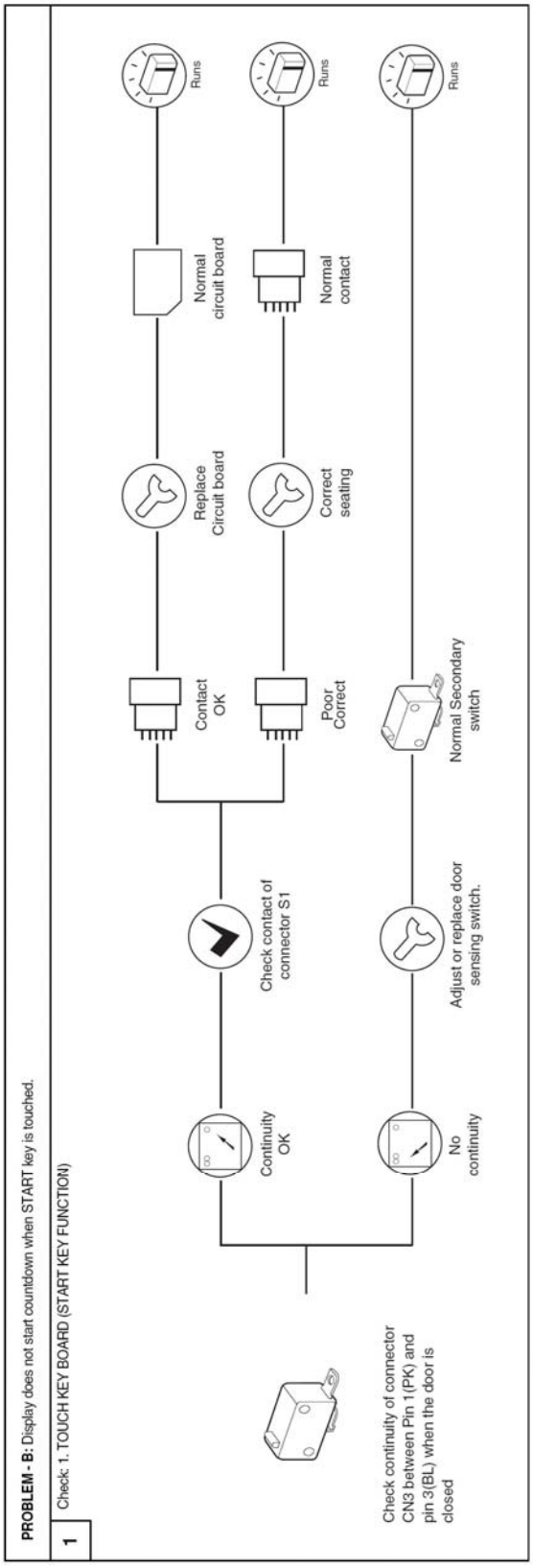


TROUBLESHOOTING FLOW CHARTS, continued

CHART B

(POWER, BUT DOESN'T RUN)

Check the continuity of connector CN3 between pins 1 (PK-pink) and 3 (BL-black) when the door is closed.


PROBLEM - B: Display does not start countdown when START key is touched.
1
Check: 1. TOUCH KEY BOARD (START KEY FUNCTION)
Check continuity of connector CN3 between Pin 1 (PK) and pin 3(BL) when the door is closed
Continuity OK
No continuity
Check contact of connector S1
Adjust or replace door sensing switch.
Contact OK
Poor Correct
Normal Secondary switch
Replace Circuit board
Correct seating
Normal circuit board
Normal contact
Runs
Runs
Runs

TROUBLESHOOTING FLOW CHARTS, continued

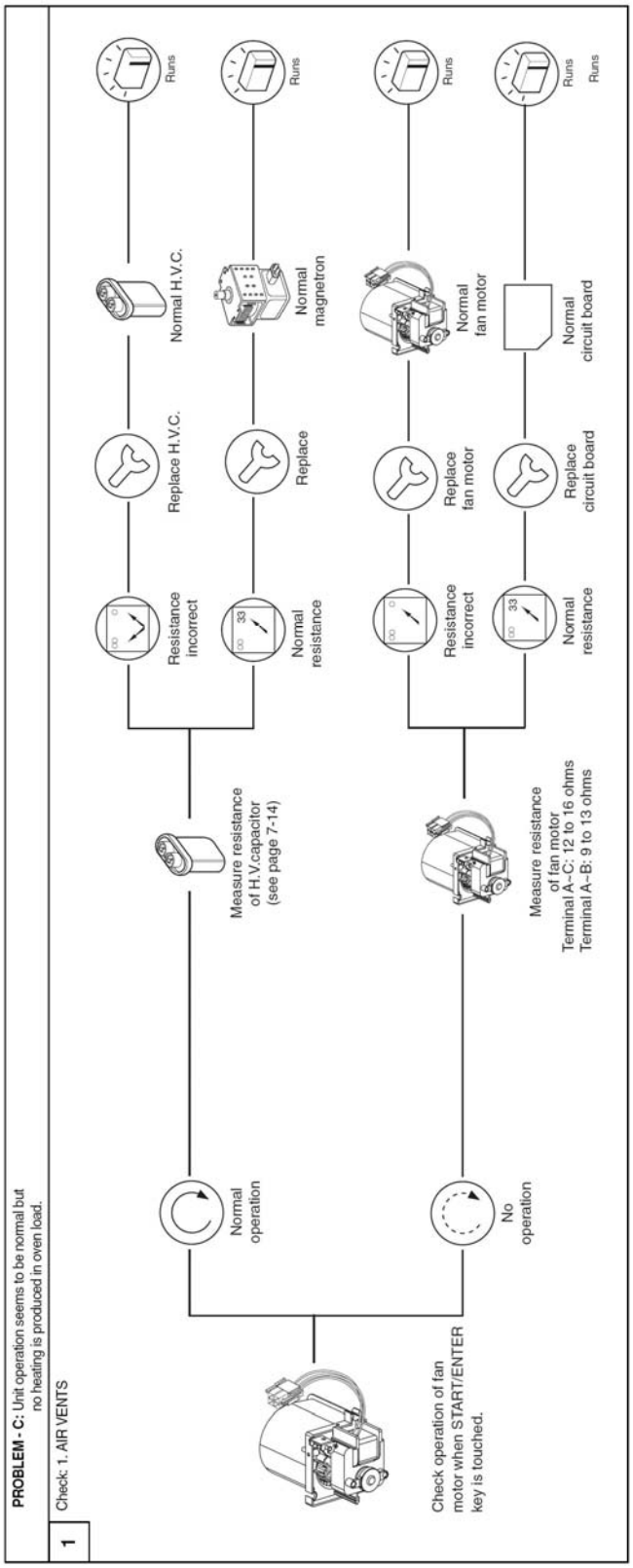
CHART C

(RUNS, BUT NO HEAT)

Check to make sure the fan motor runs when **START/ENTER** is pressed.

If the fan doesn't run, check the resistance of the fan motor.
Pins A and C – 16 Ω ±2 Ω
Pins A and B – 11 Ω ± 2 Ω

If the fan motor is defective, it will also affect the stirrer fan motor, because the center tap of the main fan motor provides the 21 V_{AC} supply for the stirrer fan.



TROUBLESHOOTING FLOW CHARTS, continued

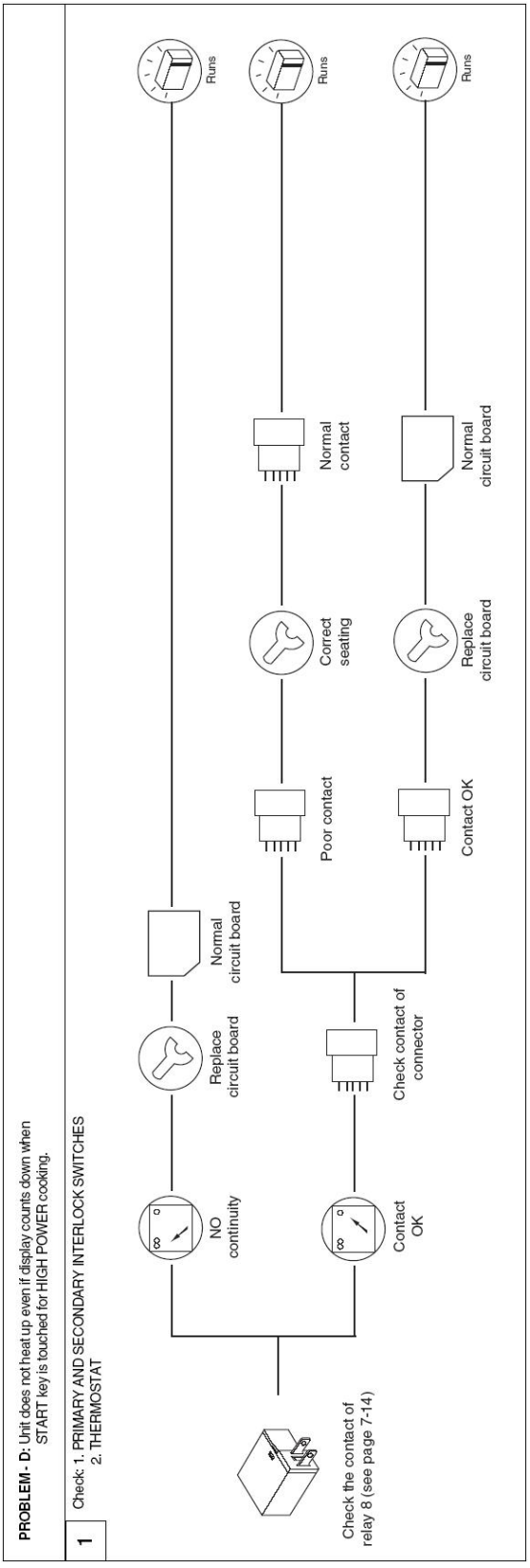
CHART D

(COUNTS DOWN, BUT NO HEAT)

Check the primary and secondary interlock switches.

Check both thermostats (TCO) for the oven cavity and the magnetron. Either switch could render the oven inoperable.

Check Relay 8.



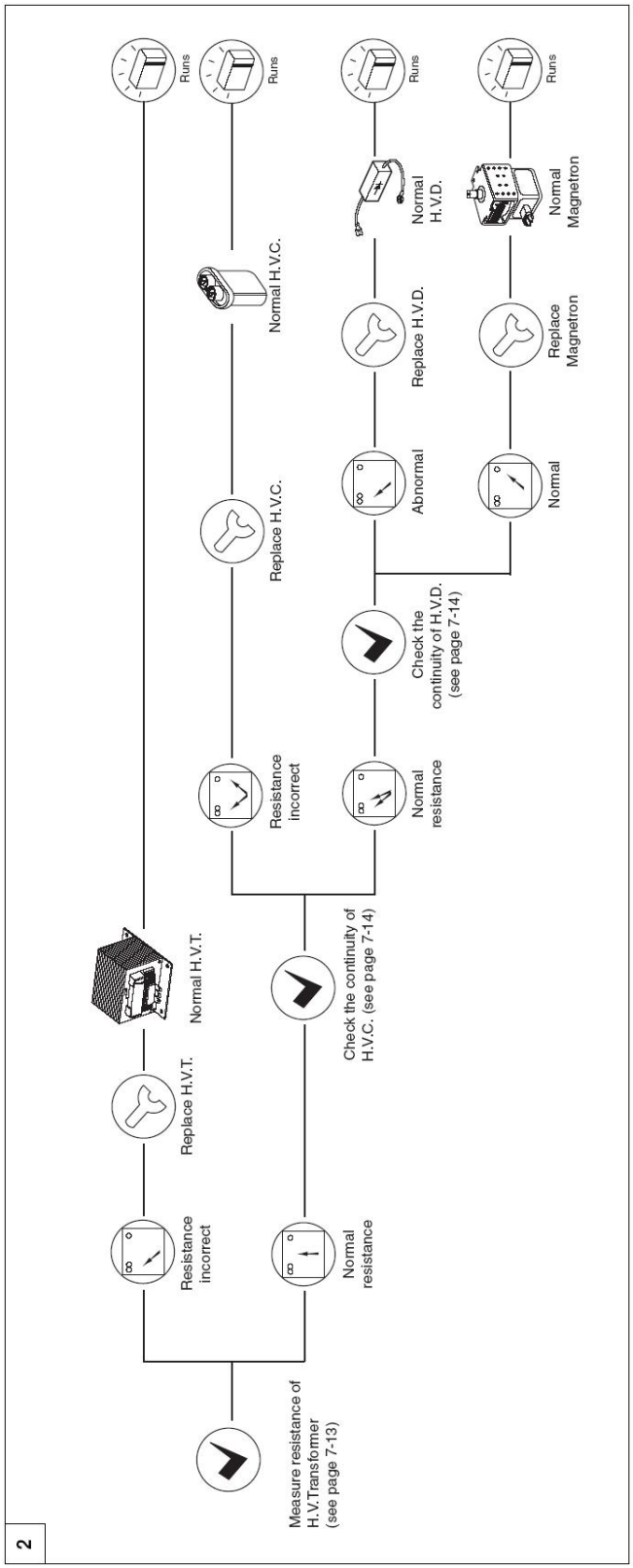
TROUBLESHOOTING FLOW CHARTS, continued

CHART D, continued

Check the resistance of the high voltage transformer. (See page 27.)

Check the high voltage capacitor. (See page 28.)

Check the high voltage diode. (See page 30.)

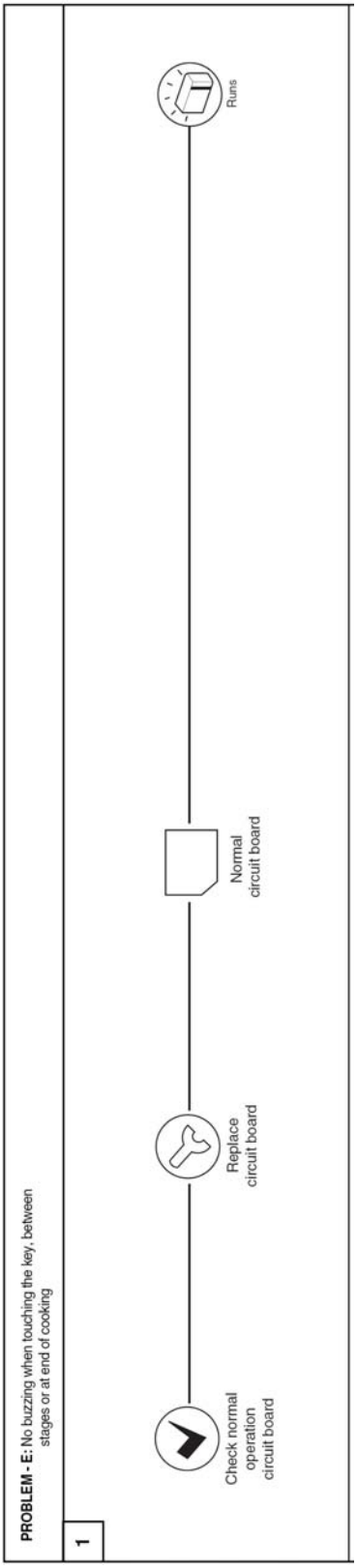


TROUBLESHOOTING FLOW CHARTS, continued

CHART E

(NO SOUND AT BUTTON OPERATION OR END OF CYCLE)

Check the PCB (Printed Circuit Board) and all connectors.

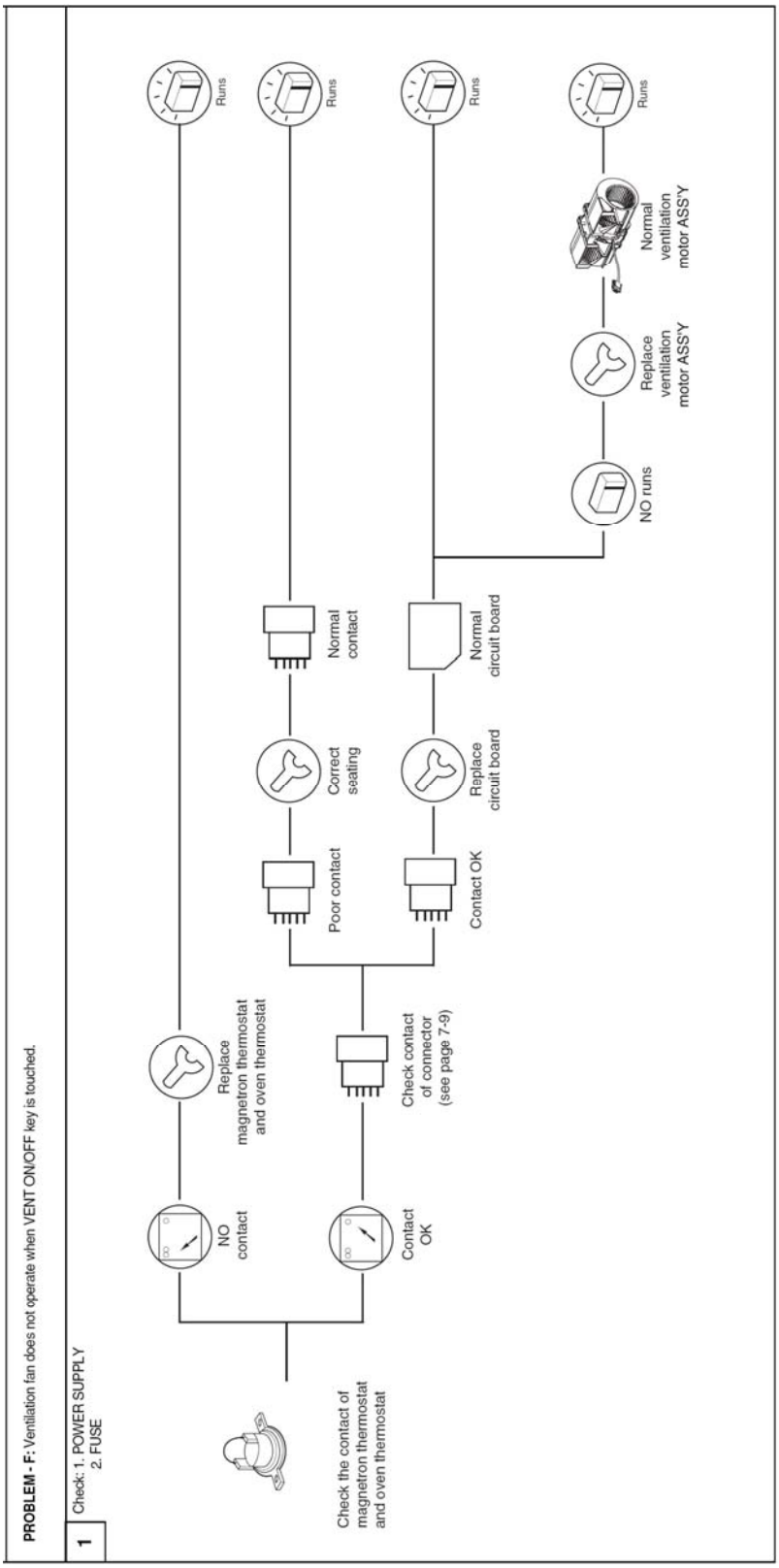

Runs
Normal circuit board
Replace circuit board
Check normal operation circuit board
PROBLEM - E: No buzzing when touching the key, between stages or at end of cooking
1

TROUBLESHOOTING FLOW CHARTS, continued

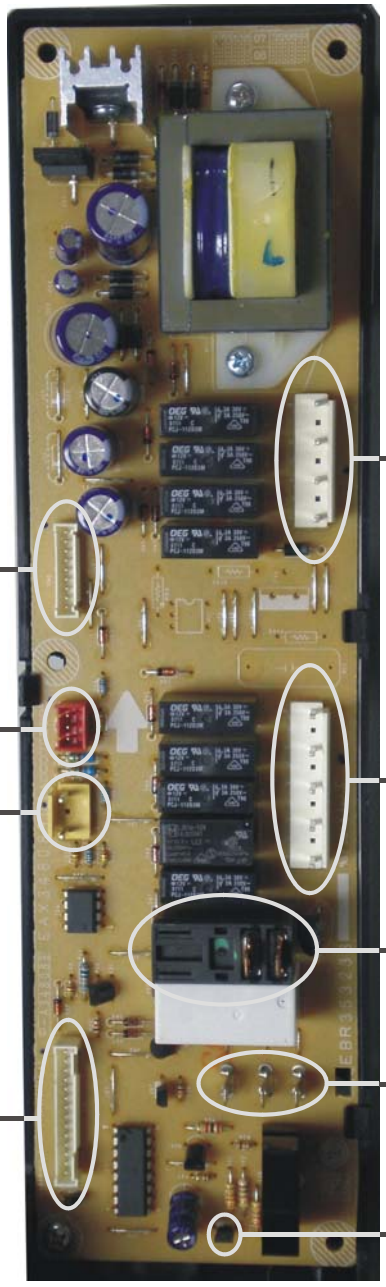
CHART F

CHECK THE POWER SUPPLY.

Check the ventilation fan for proper operation.



MAIN BOARD



CN1
Main Relay Connector
Oven Light

CN5 (10 Pin)
Connector
Main Door PCB

CN1
Connector
Oven AB Humidity
Sensor

CN2
Relay Connector
Cooktop Lights
& Vent Motor

CN1
Connector
Secondary switch

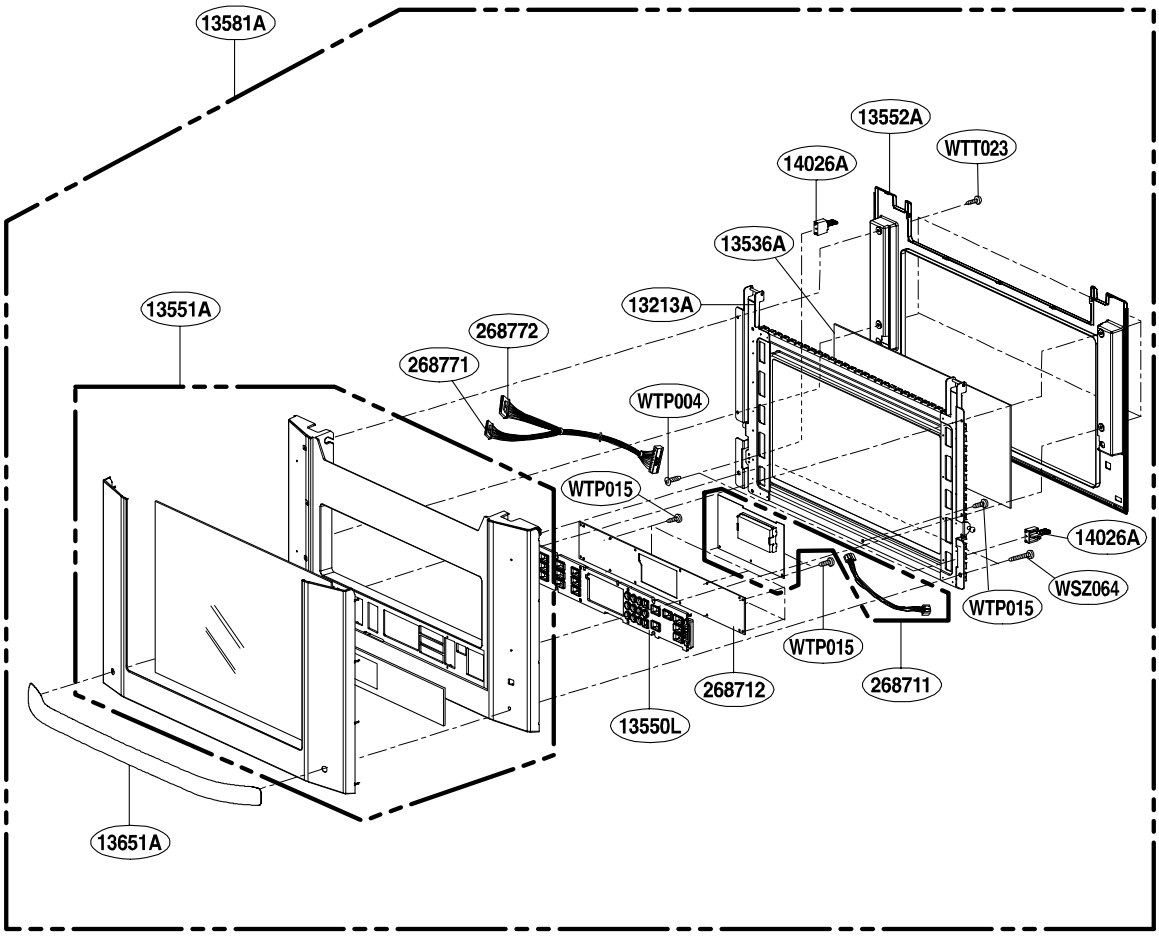
RY2
Power Relay

3-Tap
Power Relay

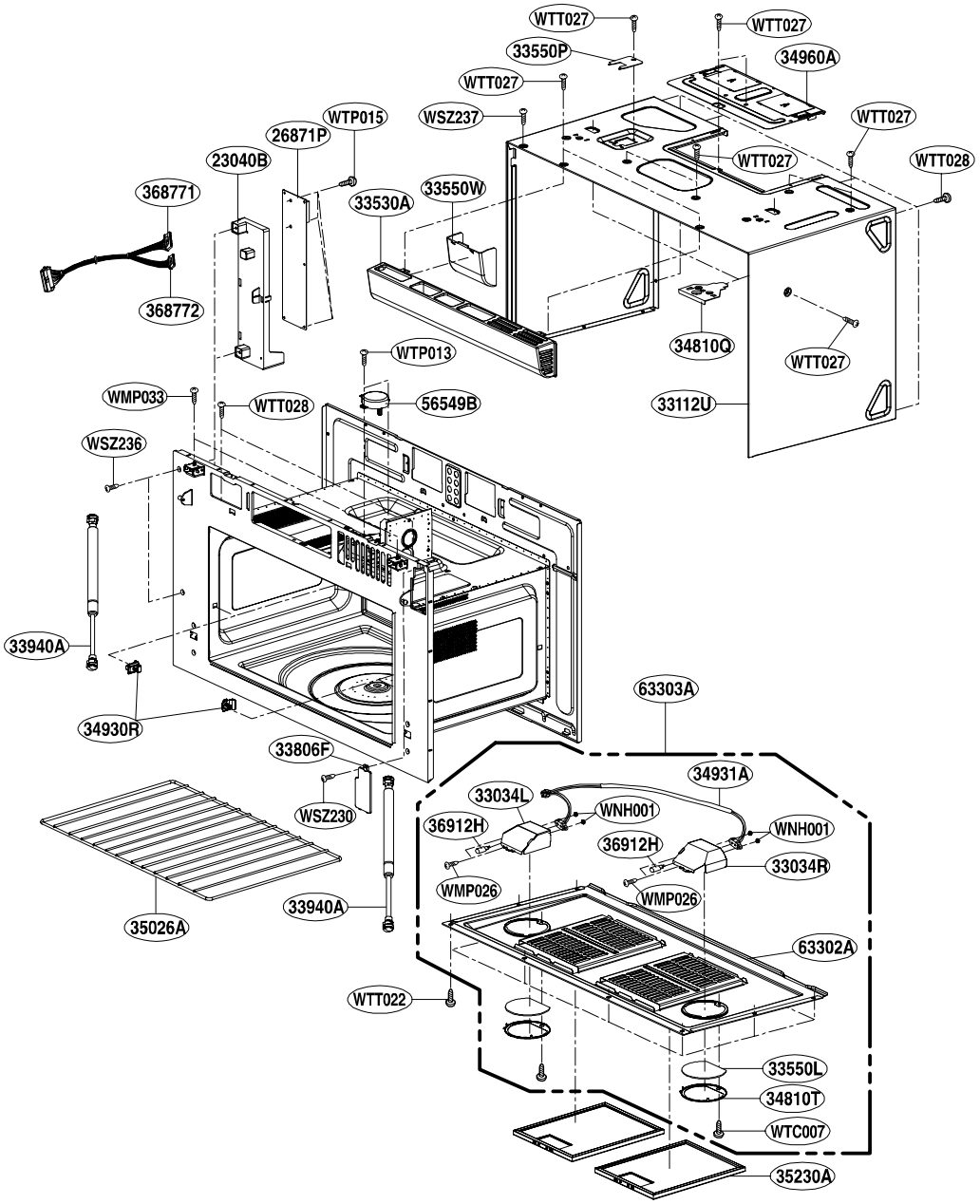
CN6 (14 pin)
Connector
Main Door PCB

TH1
Thermistor
Ambient Oven Temp

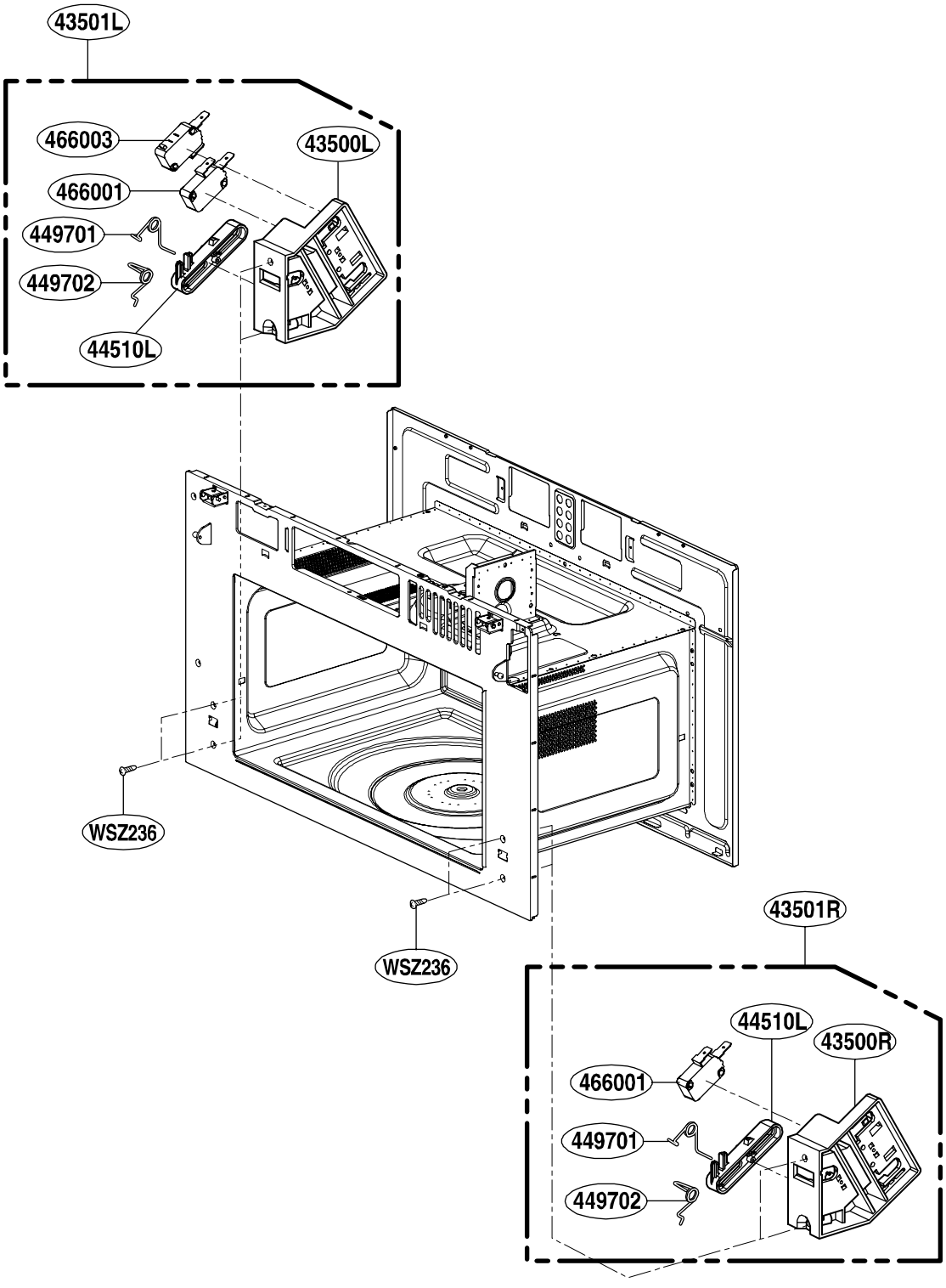
EXPLODED VIEW



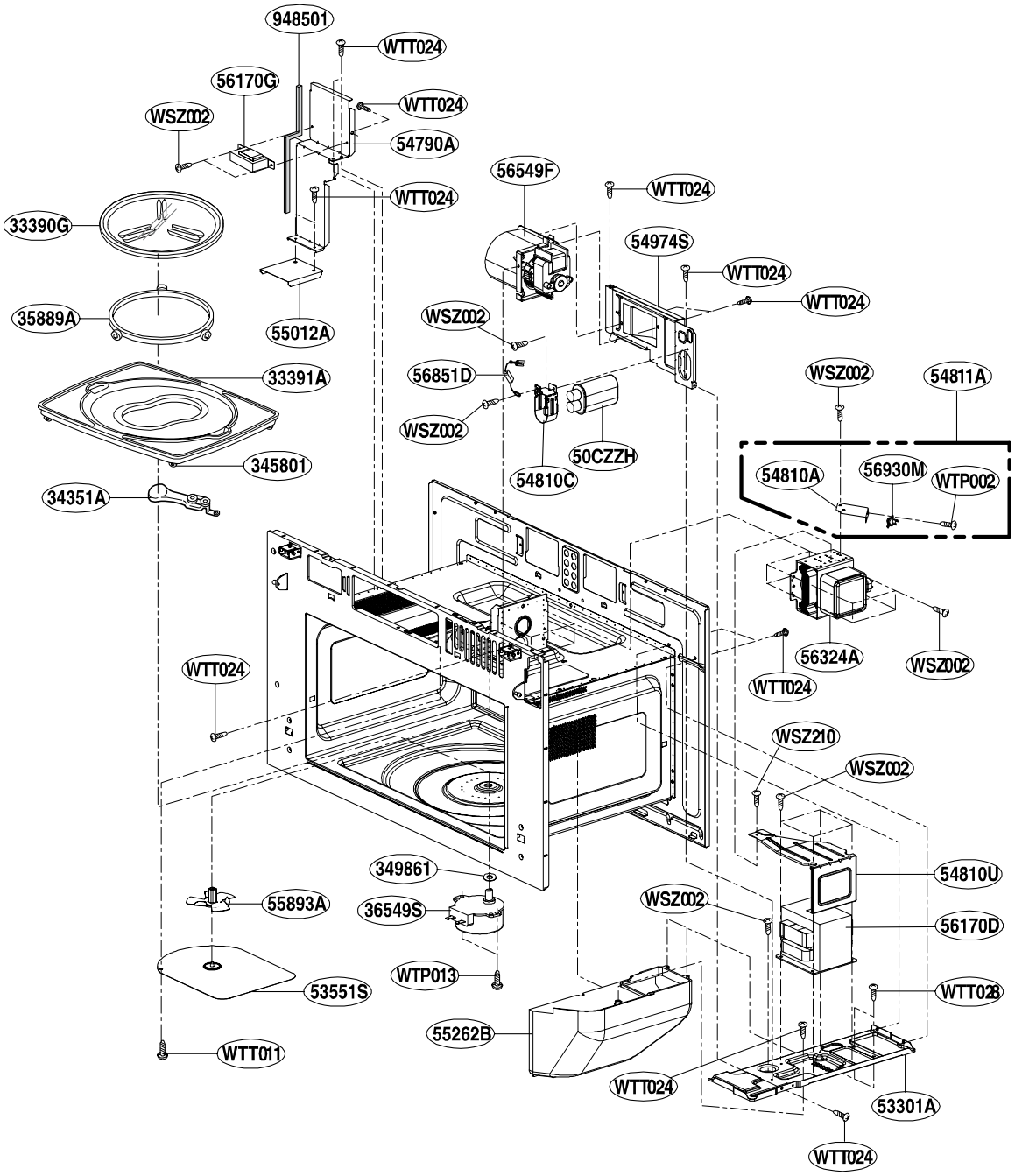
EXPLODED VIEW



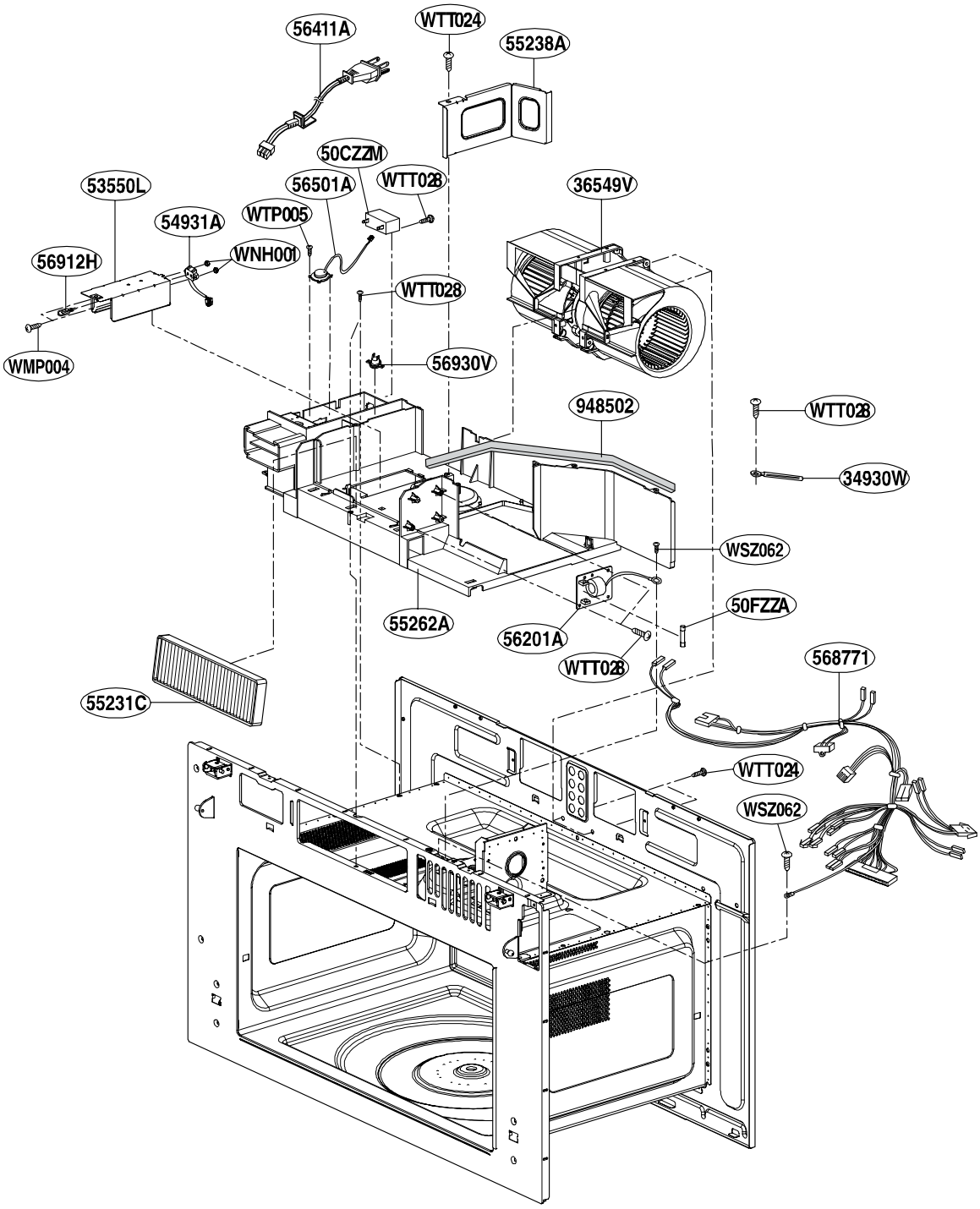
EXPLODED VIEW



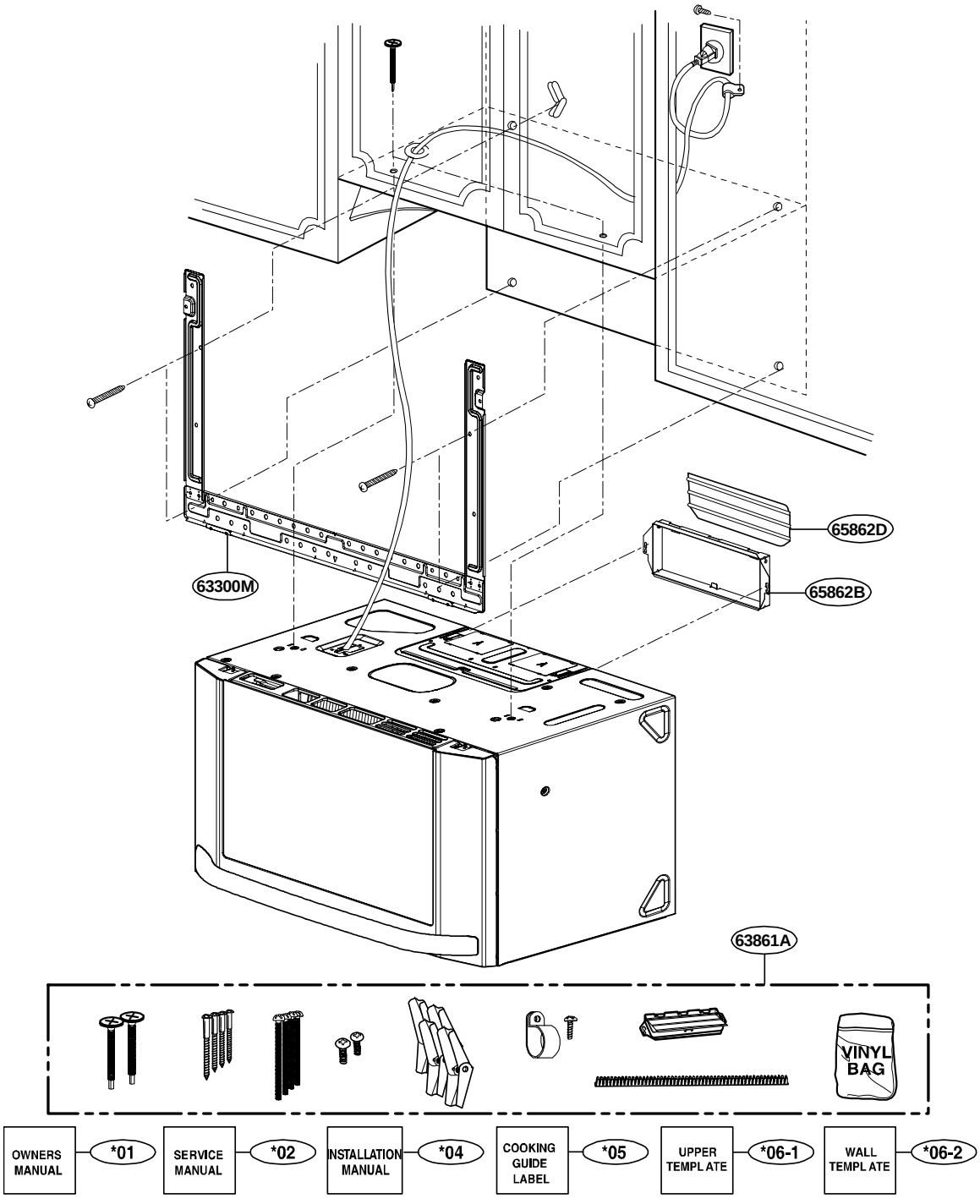
EXPLODED VIEW



EXPLODED VIEW

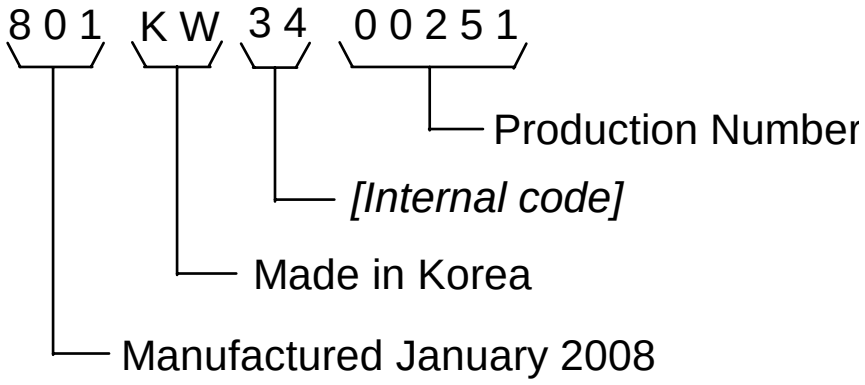


EXPLODED VIEW



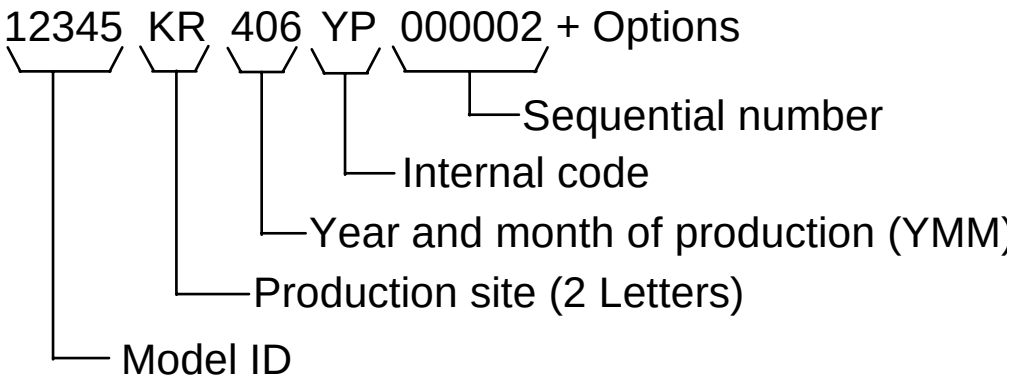
MODEL AND SERIAL NUMBERS

[Example] 801KW3400251



Newer Style With Barcode

New Serial Code (ETA Mid 2008)



PARTS LIST

Loc #	Part No	Description
*01	MFL37191403	Manual, Owners
*02	MFL06272504	Manual, Service
*04	MFL06208702	Manual, Installation
*05	MEZ37728002	Label, Cooking Guide
*06-1	4922W5A060A	Card, Template
*06-2	MBM38968801	Card, Template
*10	MAY39948401	Box
13213A	ADV32254902	Frame Assembly, Door
13536A	3536W1A007G	Tape, Sealing
13550L	MCK36295901	Cover, LED
13551A	AGM34503401	Parts Assembly
13552A	MCK36296601	Cover, Choke
13581A	ADC33594001	Door Assembly
13651A	AED33315201	Handle Assembly
14026A	MFG34660001	Locker
23040B	MAM36532001	Base, PCB
268711	EBR35323401	PCB Assembly, Main
268712	EBR35324101	PCB Assembly
26871P	EBR35323801	PCB Assembly, Power
268771	EAD37950903	Harness, Single
268772	EAD37950901	Harness, Single
33034L	MGW36299201	Reflector
33034R	MGW37450401	Reflector
33112U	MBN36305302	Case, Flat
33390G	3390W1A033A	Tray, Glass
33391A	3391W1A002B	Tray Assembly
33530A	MDX36305501	Grille, Vent
33550L	MCK36298901	Cover, Lamp
33550P	3550W3A084A	Cover, Power Cord
33550W	MCK37457001	Cover, Wire
33806F	MCR36532701	Decor, Front
33940A	MCQ38867501	Damper, Absorbing
34351A	4351W1A003B	Ring Assembly
345801	4580W3A001B	Roller
34810Q	4810W3G062A	Bracket, Mount
34810T	MAZ36299101	Bracket
34930R	MEG37236101	Holder, Cook Auxiliary

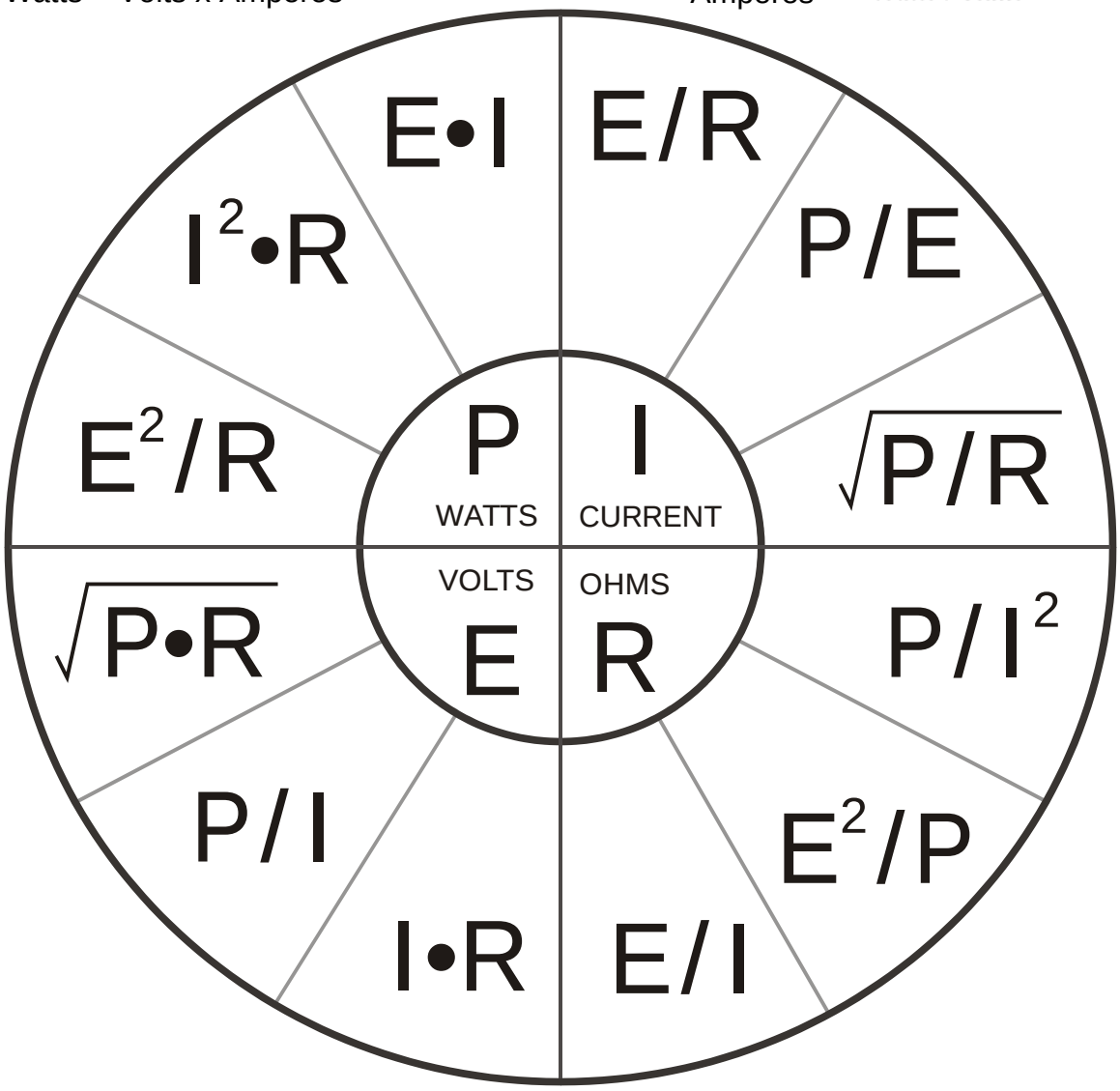
Loc #	Part No	Description
34930W	4B72510F	Holder, Wire
34960A	MCK36305401	Cover, Motor
349861	4350W4A007J	Gasket (Turntable drive shaft)
35026A	MHL38867201	Shelf (Wire rack)
35230A	MDJ37601501	Filter, Grease (2 each)
35889A	5889W1A014B	Turntable Assembly (Rotating ring)
36549S	6549W1S018C	Motor, AC Synchronous (turntable fan)
36549V	EAU37364801	Motor Assembly, AC, (Vent fan)
368771	EAD37950902	Harness, Single
368772	EAD37950904	Harness, Single
36912H	6912W3H001C	Lamp, Halogen, Cooktop 10 W
43500L	MEG36304701	Holder, Locker
43500R	MEG36304701	Holder, Locker
43501L	AEJ33593401	Holder Assembly, Locker
43501R	AEJ33593402	Holder Assembly, Locker
44510L	MFC34659201	Lever
449701	4970W1A006B	Spring
449702	4970W1A007B	Spring
449703	4970W1A007B	Spring
466001	6600W1K004C	Switch, Micro
466003	6600W1K004B	Switch, Micro
50CZZH	0CZZW1H004A	Capacitor, High Voltage 0.95µF 3%
50CZZM	0CZZW1M001D	Capacitor, Film, Box (Vent fan) 14µF
50FZZA	3B74133K	Fuse, Time Delay, Ceramic 250 V, 20 A
53301A	AGU33587601	Plate Assembly, Bottom
53550L	MCK30584402	Cover, Lamp (Internal shield)
53551S	ACQ33587501	Cover Assembly, Stirrer Fan (Mica)
54790A	MAL38267301	Barrier
54810A	MAZ38267101	Bracket, Thermostat (TCO)
54810C	MAZ36531801	Bracket, Capacitor
54810U	MAZ39866701	Bracket, Damper, Fan Duct on XFMR
54811A	ABA33739501	Bracket Assembly
54931A	4931W3A004B	Holder Assembly, Cavity Lamp
54974S	MEA36304601	Guide, Suction
55012A	MEV39815201	Insulator
55231C	5230W1A003C	Filter, Charcoal
55238A	MEA36304401	Guide, Air
55262A	MCZ36304201	Duct (Upper plastic air guide)
55893A	ADP33587401	Fan Assembly (Stir fan blade)
56170D	6170W1D100C	Transformer, high voltage

Loc #	Part No	Description
56170G	6010W2L003D	Transformer, power
56201A	2B72130F	Filter, AC Line
56324A	6324W1A001S	Magnetron 2M282H
56411A	6411W1A014T	Power Cord Assembly (1.6 m/ 4 ft.)
56501A	6501W1A013A	Sensor Assembly
56549B	6549W1S002G	Motor, AC Synchronous (stir fan) 21 V, 180 MA, 34.9 RPM
56549F	EAU37848601	Motor, AC Circulation (Magnetron cooling / cavity circulation)
56851D	6021W3B001Q	Cable, Assembly, incl. HV Diode
568771	EAD37851801	Harness, Single
56912H	6912W3H001D	Lamp, Halogen, Cavity 20 W (See also 36912H)
56930M	6930W1A003K	Thermostat (TCO Thermal Cut Off, magnetron)
56930V	6930W1A003J	Thermostat (TCO Thermal Cut Off, cavity vent)
63300M	3301W0A003C	Plate Assembly (Mounting bracket, 3-piece welded)
63302A	MGJ36298102	Plate, Base
63303A	AAN32256101	Base Assembly
63861A	2B72771H	Kit Assembly (Installation hardware kit)
65862B	3B72144A	Bracket, Idle (Damper Housing)
65862D	3B71432A	Damper Flap
948501	3B72244R	Damper, Polyethylene foam, adhesive
948502	3B72244P	Damper, Polyethylene foam, adhesive
WMP026	1MPC0302818	Screw, Machine, Pan head 3 X 12 mm
WMP033	1MPC0403218	Screw, Machine, Pan head 4 X 18 mm
WNH001	1NHA0300018	Nut, Common, Hex 3 mm
WSZ002	1SBF0402418	Screw, Taptite, Locking head 4 X 8 mm
WSZ062	4000W4A003A	Screw, Custom 4 mm X 10 mm
WSZ064	4000W4A004A	Screw, Custom 5 mm X 25 mm
WSZ210	1SBF0302418	Screw, Taptite 3 mm X 8 mm
WSZ236	FAB30134901	Screw, Custom Hex head 4 X 14 mm
WSZ237	1SZZW2E001A	Screw, Custom 4 mm X 14 mm
WTC007	1TCL0402622	Screw, Tapping, Flat head 4 X 10 mm

OHM'S LAW and WATT'S LAW

P = WATTS
Watts = Volts^2 x Ohms
Watts = Amperes^2 x Ohms
Watts = Volts x Amperes

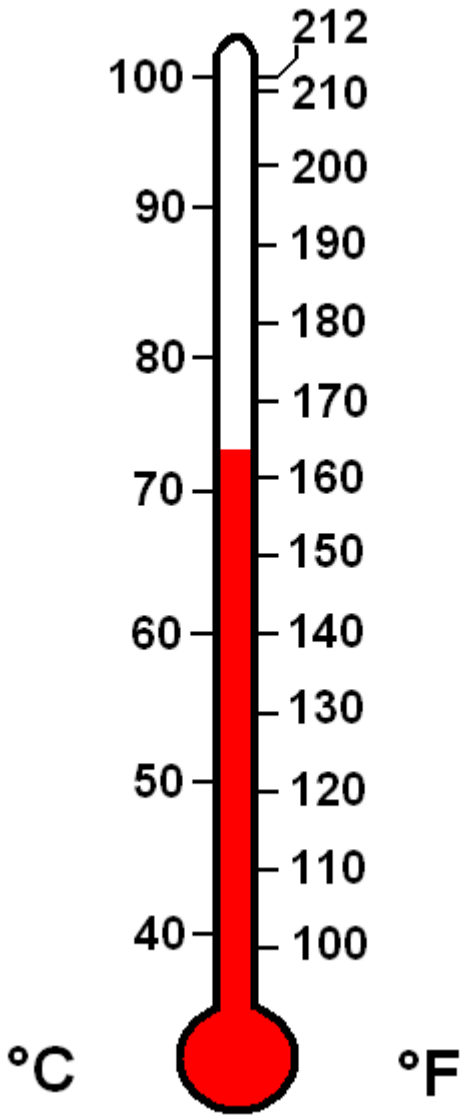
I = AMPERES
Amperes = Volts / Ohms
Amperes = Watts / Volts
Amperes = $\sqrt{\text{Watts / Ohms}}$



E = VOLTS
Volts = $\sqrt{\text{Watts x Ohms}}$
Volts = Watts / Amperes
Volts = Amperes x Ohms

R = OHMS
Ohms = Volts / Amperes
Ohms = Volts^2 / Amperes
Ohms = Watts / Amperes^2

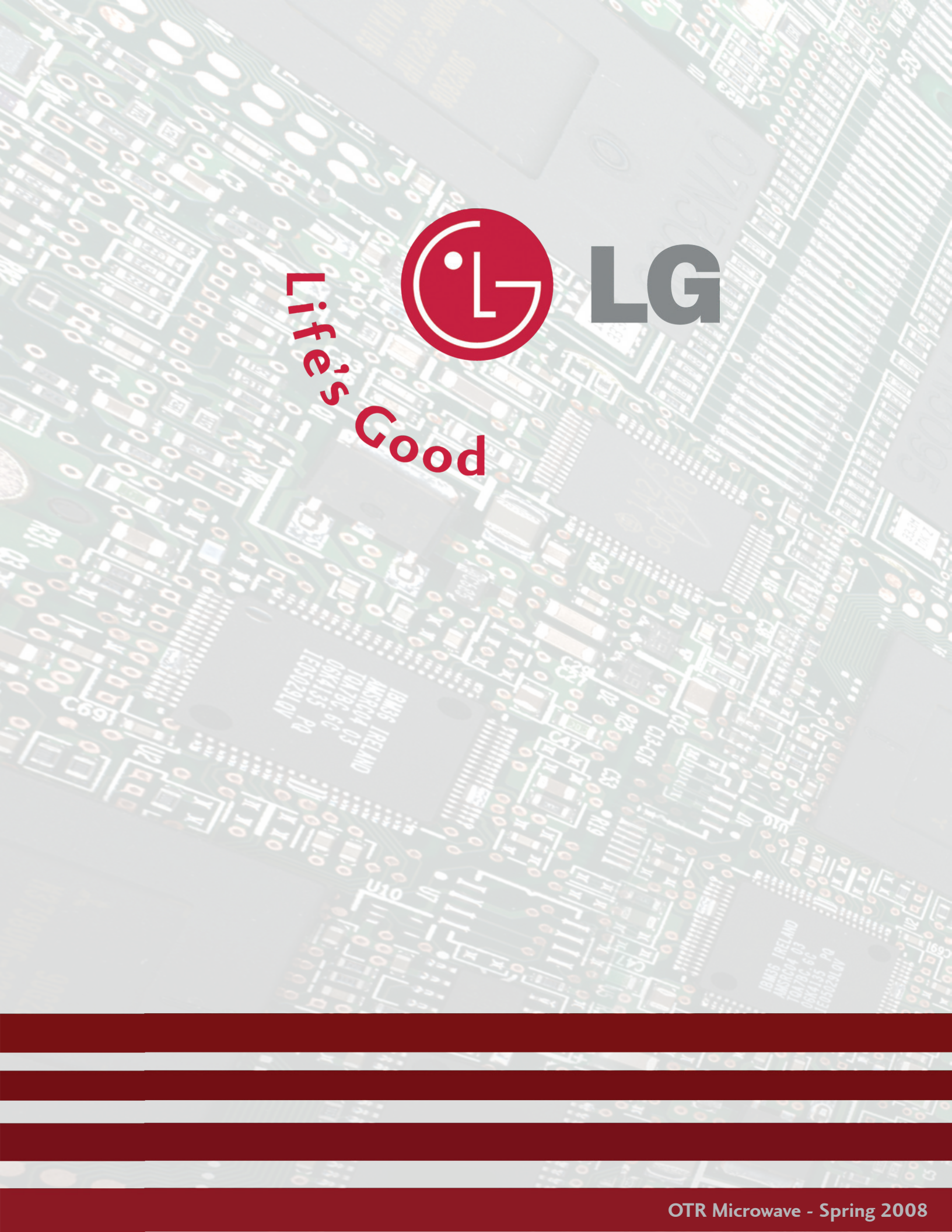
CONVERSION INFORMATION



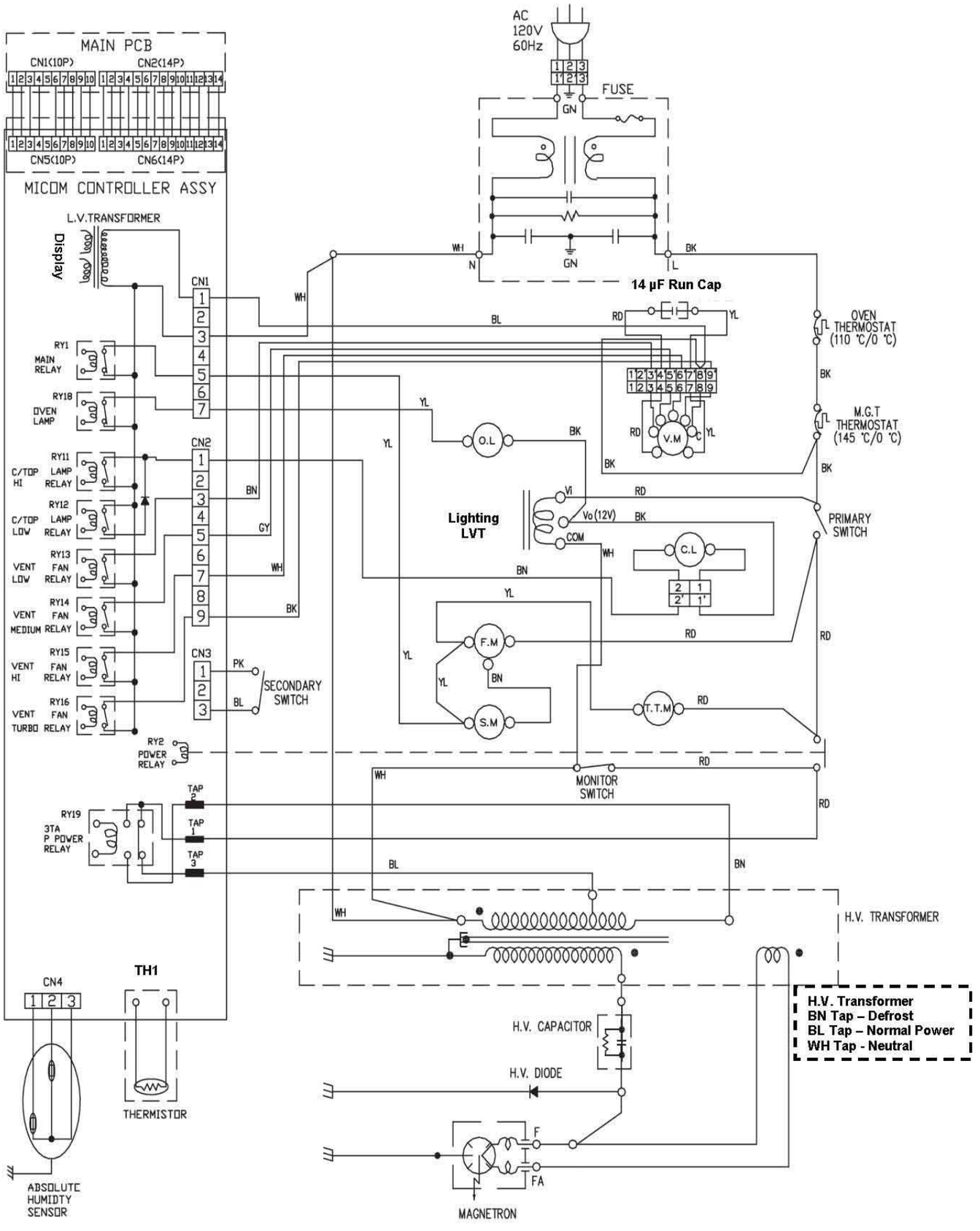
FORMULAE

°F = (9/5) °C + 32

°C = (5/9) x (°F – 32)



OTR Microwave - Spring 2008



CONTROL MODULE

7 PIN CONNECTOR(CN1) | 9 PIN CONNECTOR(CN2) | 3 PIN (CN3) CONNECTOR | 3 PIN(CN4) CONNECTOR (FOR SENSOR)

WIRE COLORS

SYMBOL	COLOR
WH	WHITE
BK	BLACK
RD	RED
YL	YELLOW
PK	PINK
BL	BLUE
BN	BROWN
GN	GREEN
GY	GREY

C.L. – Counter Light **S.M. – Stirrer Motor**
F.M. – Fan Motor **T.T.M. – Turn Table Motor**
O.L. – Oven Light **V.M. – Vent Motor**
TH1 – Ambient Oven Thermistor Cut In 180°F / Cut Out 130°F
Oven Thermostat – Opens 250°F / Closes 32°F
MGT Thermostat – Opens 320°F / Closes 32°F